A CHILTON PUBLICATION

The Iron Age

THE NATIONAL METALWORKING WEEKLY

UNIV. OF MICHIGAN

May 31, 1951

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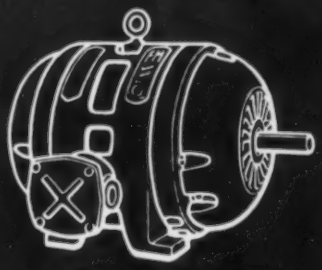
Enclosed Fan Cooled



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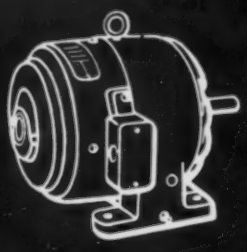

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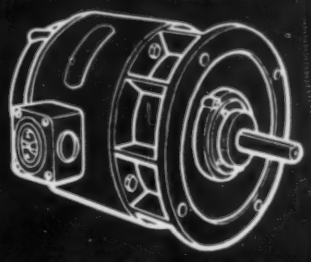

Flange-Mounted Motors

hen it comes to Motors...

stand to gain much in dealing with your Fairbanks-e Branch or Dealer as the single source for *all* electric motor requirements. Not the least are the efits of undivided responsibility, unprejudiced ice and application assistance. For your copy e handy "Pocket Panorama" which illustrates complete line . . . write Fairbanks, Morse & Co., cago 5, Illinois.

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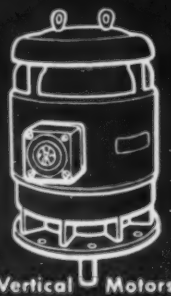
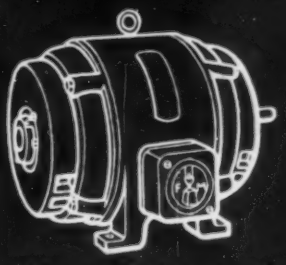
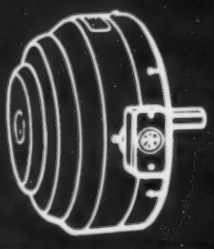
ELECTRIC MOTORS AND GENERATORS • MAGNETOS • PUMPS
DIESEL LOCOMOTIVES AND DIESEL ENGINES • FARM MACHINERY
SCALES • RAIL CARS • HOME WATER SERVICE EQUIPMENT



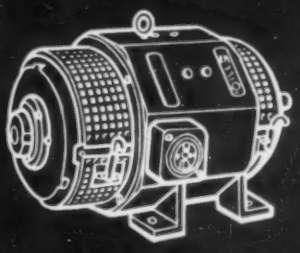
Vertical Motors



General-Purpose Ball-Bearing Motors

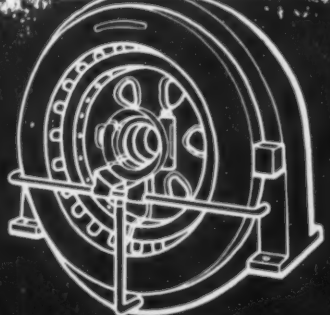


Axial Air Gap Motors

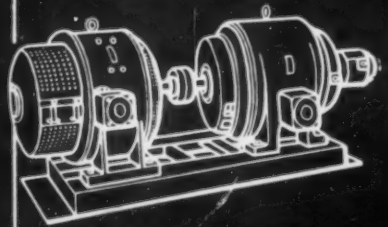


D.C. Motors

eed A.C. Generators



Low-Speed A.C. Generators



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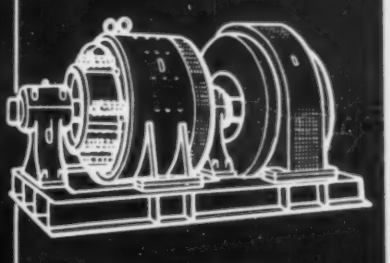
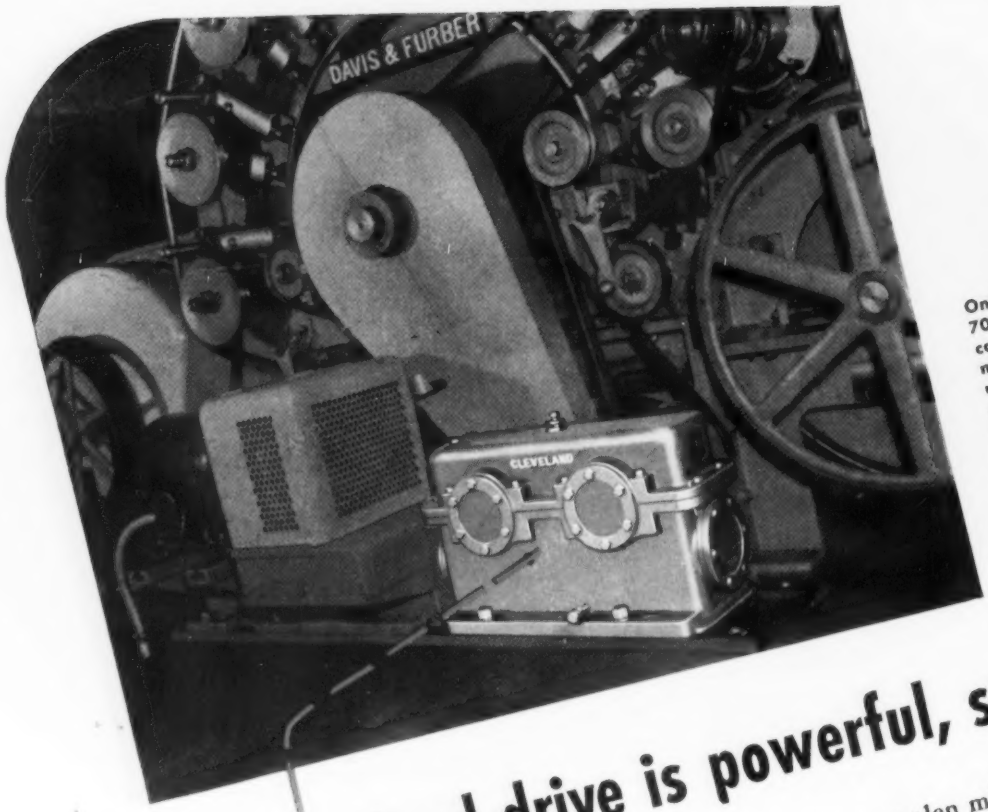


Frequency Changer



One of three Cleveland special 70AT units driving a woolen card at one of the large textile mills in New Hampshire. The unit pictured drives the main card cylinder, stripper rolls and the fancy roll. There are powerful, right-angle Cleveland drives for every type of service.

Compact Cleveland drive is powerful, sure and safe

Adequate aisle space is essential in a woolen mill—so units that drive woolen cards must be compact, yet powerful enough to do the job. That's why the Davis and Furber Machine Company of North Andover, Massachusetts, has made Cleveland Worm Gear Speed Reducers standard equipment on its new Model L carding machine.

In addition to allowing needed space between cards, Cleveland drives mean safer working conditions. Large diameter pulleys and flat belting, once a serious safety hazard, are eliminated.

Cleveland is first choice for any job where a powerful, trouble-free, right-angle drive is desired. Engineers know from experience that they can depend on Cleveland, wherever they serve. They give satisfactory service, no matter how severe the conditions.

For specifications and other details, write for our current catalog. The Cleveland Worm & Gear Company, 3252 East 80th Street, Cleveland 4, Ohio.

Affiliate: The Farval Corporation, Centralized Systems of Lubrication. In Canada: Peacock Brothers Limited.

CLEVELAND
Worm Gear
Speed Reducers

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Are You Ordering Higher Alloy Grades Than Necessary for Your Defense Orders?

Many of the high-priority defense orders now being submitted by manufacturers of essential equipment call for steels considerably richer in alloy content than is necessary.

Such practice is wasteful. It wastes nickel, molybdenum and other alloying elements that are in short supply throughout the nation.

Here is an example. Bethlehem recently received an approved order for 4340 nickel-chromium-molybdenum steel, aircraft-quality, in a small size presumably for aircraft-engine parts. After Bethlehem metallurgists looked into the situation it developed that this steel was actually intended for making brackets that hold together the crates in which aircraft engines are shipped. It was obvious that ordinary carbon steel would serve the purpose, and our metallurgists recommended the use of 1045 grade, which was finally accepted.

Generally speaking, unless special properties such as heat-resistance or corrosion-resistance are required, there is no advantage in using steels with more alloy content than the minimum needed to make the piece quench out properly. Over-alloying will only serve to increase the sensitivity of the steel to quenching cracks. If you have any questions, particularly on conservation of the alloy steels needed for defense purposes, call or write for metallurgical advice.

BETHLEHEM STEEL COMPANY
BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation
Export Distributor: Bethlehem Steel Export Corporation

BETHLEHEM ALLOY STEELS

BETHLEHEM STEEL

IRON AGE

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IRON AGE *summary*

iron and steel industry trends

Optimism over steel supply is too early . . . Guns-plus-butter deferred till 1952 . . . Some critical alloys limit alloy and stainless.

Not Yet Enough—Optimistic statements on future steel supply by top-drawer officials of government and industry will probably come true in 1952. But right now there is not enough steel to support the guns-plus-butter economy to which we are committed. And there won't be enough for a good many months to come. We must build up to our economic commitments just as we must build up to our political and military commitments.

Steel expansion is in good hands. Steel was one of the first industries to respond to the urgent need for more capacity and more production. While other expansion programs were still being debated, steel companies made heavy expansion commitments which will raise the industry's annual capacity close to 120 million net tons by the end of 1952 or early 1953. This is almost a 20 pct expansion, which alone is about what Washington officials estimate will be needed for strictly military needs.

Three Hard Jobs—This capacity will fulfill the estimates of future military needs and still support a record-breaking civilian economy. But no one can blame the manufacturer who is being starved for lack of metal from taking a more short-sighted view.

The blunt fact is, there is not now enough steel to meet all demands by all types of users. The fabricator who can't get steel to keep his plant running knows that. So does the NPA official who is trying to keep requirements from exceeding supply by slashing requests for steel. So does the harried steel salesman who is constantly receiving letters from small fabricators that would bring a lump to the throat of the most hardened official or executive.

The "Free" Disappears—Steel mills this past week have been swamped with a new avalanche of DO orders resulting from the last increase in DO set-asides. The orders have come in so fast and heavy that some mills still have no idea where they stand for July. Others are certain, from orders received so far, that they will have no "free" steel left over in July on bars, shapes and plates.

One mill reports it will have to again boost the amount of plate produced on its strip mill to meet its share of the directive on plates. Another mill has been turning out a large tonnage of plates on its strip mill for several months. If steel for their own expansion is added to DO and directive tonnage, several mills are getting close to 75 pct controlled distribution—on some products it is 100 pct.

A Trite Pun?—Chances of early delivery on "free" steel carry-overs are not bright. Consumers washed out in May and tacked on the June list won't stand a much better chance than they did in May. That may mean extending them again. A sad saying frequently heard is "old quotas never die, they just fade away."

Consumers are redoubling their efforts to get DO's in before the books are closed. Some are sending orders by registered mail, which requires a dated receipt. Some customers who have extended DO orders are canceling them and re-entering them in an earlier month—this is made possible by the revised set-aside percentages.

Critical Alloys—The limiting factor on output of alloy and stainless steel is not capacity, but availability of critical alloys—nickel, molybdenum, cobalt and columbium. Last week NPA temporarily suspended all alloy and stainless steel melt schedules for June output of DO and directed orders calling for these alloy elements. In a separate move, NPA prepared to order greatly increased set-asides of stainless steel products for third-quarter mobilization needs. Set-asides of most products were set at 75 to 100 pct.

(Nonferrous summary, p. 104)

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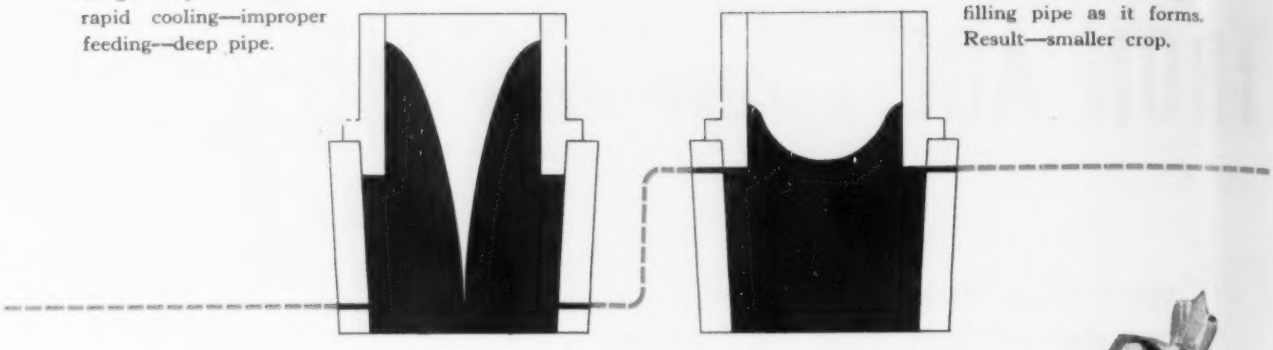
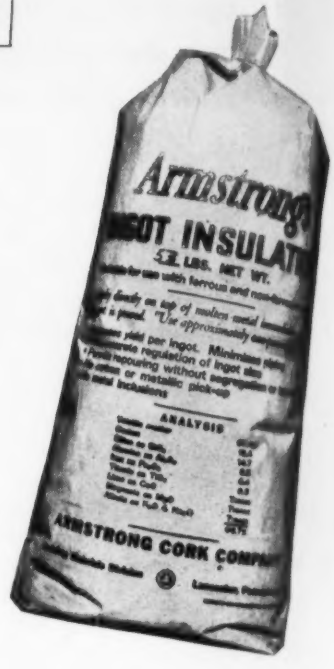

WITHOUT ARMSTRONG'S INGOT INSULATION
Large crop because of rapid cooling—improper feeding—deep pipe.
WITH ARMSTRONG'S INGOT INSULATION
Steel stays molten longer, filling pipe as it forms. Result—smaller crop.

20% to 30% less ingot-cropping loss

when you use this ingot insulation



How would you like to reduce cropping loss 20% to 30% on every ingot you pour?

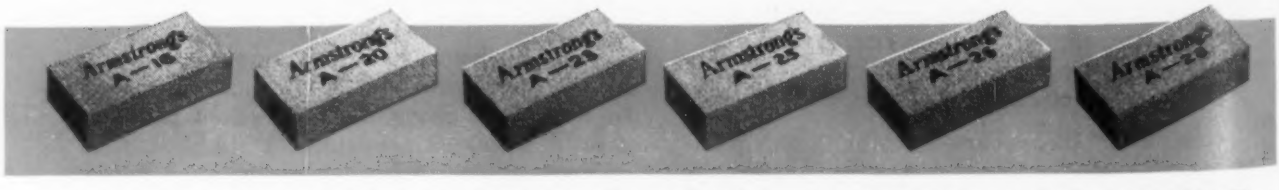
You can . . . if you top each ingot with Armstrong's Ingot Insulation, a material composed of carefully graded particles of cork coated with special clays. Here's how this steel-saver works in reducing ingot crop.

When you apply Armstrong's Ingot Insulation to the top of the molten metal after pouring, you're trapping heat right in the hot top. As a result, rapid cooling is prevented and the steel stays molten longer. Being molten, it "feeds" properly and fills the pipe as it forms. You avoid the waste of deep pipe penetration.

The insulating value of the cork remains effective and working for you right through solidification. For, protected by their clay coating, the cork particles are not consumed immediately by the heat of the molten steel.

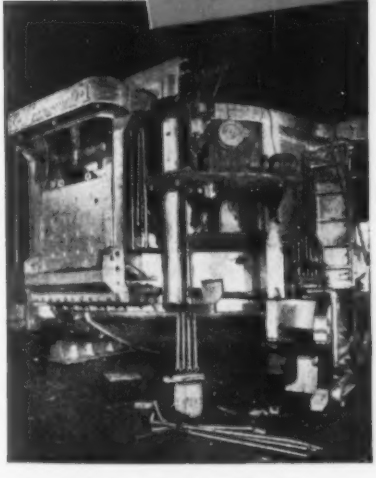
This is a clean treatment. There is no carbon pickup, no non-metallic inclusions. Neither chemical nor physical compositions are altered. Any residue of clay or cork remains intact and floats to the surface if the ingot is re-poured.

See for yourself how Armstrong's Ingot Insulation can help boost your steel output. Write to Armstrong for a free sample or have an Armstrong engineer cooperate with you in conducting tests right in your own plant. Call the nearest Armstrong office or write today to Armstrong Cork Company, 4905 Mulberry Street, Lancaster, Penna.



ARMSTRONG'S INSULATING REFRACTORIES

WE BUILD 'EM BIG!
...AND BUILD 'EM COMPLETE



WE BUILD 'EM COMPLETE: For example, even the piping is assembled and tested before shipment.

Lectromelt builds 'em bigger—Moore Rapid Lectromelt* Furnaces are built to capacities up to 150 tons. And just as important—

Lectromelt builds 'em complete. Your Lectromelt furnace is assembled and operated mechanically in *our* plant. So it gets put together faster in *your* plant. You gain production time.

Lectromelt builds 'em with all these features: top-charging design that speeds production, cuts electrode consumption, saves power, lengthens lining life; counterbalanced electrode arms; engineered power supply and regulating apparatus designed to take punishing overloads; oil-bearing-mounted top structure; side-mounted tilting mechanism. Features that enable us to say—we build 'em big; we build 'em complete—and we have mighty few calls for replacement parts. Pittsburgh Lectromelt Furnace Corporation, 312 32nd Street, Pittsburgh 30, Pennsylvania.

Manufactured in . . . CANADA: Lectromelt Furnaces of Canada, Ltd., Toronto 2 . . . ENGLAND: Birlec, Ltd., Birmingham . . . SWEDEN: Birlec, Elektkougnar A/B, Stockholm . . . AUSTRALIA: Birlec, Ltd., Sydney . . . FRANCE: Stein et Roubaix, Paris . . . BELGIUM: S. A. Belge Stein et Roubaix, Bressoux-Liege . . . SPAIN: General Electrica Espanola, Bilbao . . . ITALY: Forni Stein, Genoa.

*REG. T. M. U. S. PAT. OFF.

MOORE RAPID

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at High Speed with the New di-acro

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The DI-ACRO Rod Parters further increase the applications of "DIE-LESS DUPLICATING" as a cost cutting, time-saving production technique.

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City State

Dear EDITOR

letters from readers

Typical American

Sir:

Some time ago I wrote you that I did not like your editorials as well as those of your predecessor.

I have just read your editorial "Typical American Jones" in the May 17 issue and I take it all back. This is very, very good.

I have been on the point of writing you before that I liked your editorials but I procrastinated. The present editorial, however, makes it absolutely necessary that I write and take it back.

E. R. SCUDDER
General Manager
Jarvis & Jarvis, Inc.
Palmer, Mass.

Sir:

Why do I keep writing you! I guess it's because of those sincere typically American editorials. T. A. Jones is typical of many people.

Keep up the good work.

E. L. SOLOMON
Max Solomon Co.
Pittsburgh

Editorial Merit

Sir:

I would like your permission to reprint some of your editorials in our monthly publication "Columnrite."

I can assure you that any editorial used would be reprinted in its entirety, with full credit given to THE IRON AGE.

Please accept my personal compliments on your editorial "Typical American Jones" appearing in your May 17 issue.

H. C. HATCH
Adjutant
Glen Rock Post No. 145 American Legion
Glen Rock, N. J.

Coal-breaker

Sir:

In the May 3 issue of THE IRON AGE, p. 141, reference is made to a nonexplosive device to break coal. The article states that the device functions by compressed gas. This invention sounds very interesting and we wonder if it could be applied to other breaking operations.

If you would advise us where we can get additional information on this device, we would appreciate it.

E. V. SMITH
Aluminium Laboratories Ltd.
Arvida, Quebec

The nonexplosive device for breaking down coal is "Chemechol", a product of E. I. Du Pont de Nemours & Co., Inc., Wilmington, Del. The new product is in a transition stage from laboratory to extensive field testing. Du Pont will be able to supply you with additional information. —Ed.

Titanium Fasteners

Sir:

We would like very much to know who is making the line of small bolts, nuts and rivets of titantium mentioned on the Newsfront page of your Apr. 19 issue.

Any additional information on this subject would also be greatly appreciated as it is a field we have been exploring for some time without any notable success.

H. F. PHIPARD
Chief Engineer
Continental Screw Co.
New Bedford, Mass.

Reed & Prince Mfg. Co., Worcester, Mass. is the producer of the small titanium products.—Ed.

Foundry Substitutes

Sir:

We wish to refer to the item "Foundry Substitutes" in the Assembly Line of your Apr. 26 issue which states that a large auto firm had acquired a supply of tungsten high speed steel grindings.

Would it be possible for you to tell us the name of the auto firm referred to or who may be able to give us this information.

D. N. LANDAY
The M. N. Landay Co.
Pittsburgh

Ford Motor Co., Dearborn, Mich., is melting down tungsten high speed steel grindings for use in valves and not camshafts as originally reported.—Ed.

For the Records

Sir:

I am very much pleased with your presentation of my article "Navy Studies Jet Structural Alloys at Intermediate Temperatures" in your May 10 issue.

The Manual of Instructions governing policies of the Naval Air Experimental Station requires the following sentence to be forwarded with every manuscript for use in publication: "The views expressed herein are those of the author and do not necessarily constitute those of the Navy Department."

The exclusion of the aforementioned sentence, during publication, puts the writer in a precarious position subject to disciplinary action.

J. F. ERTHAL
Naval Air Experimental Station
U. S. Naval Base
Philadelphia

We're sorry we failed to include that sentence.—Ed.

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37% SAVED on BRONZE BAR STOCK!

. . . by buying Asarcon 773 (SAE 660) in exactly the length needed.

If the shop had used standard 13″ lengths of bronze, it would have bought 569 lbs. of metal . . . because the job called for twenty-one 8″ lengths of 3″ diameter tubular bars with a wall thickness of 1″.

By ordering Asarcon 773 in exactly the length required . . . an 82″ piece and a 90″ piece . . . the shop bought only 356 lbs. of metal. Savings over 37%! And no short ends!

Asarcon 773 bar and bearing bronze is continuous-cast in diameters ½″ to 5″, cored or solid, in 105″ lengths . . . 216 stock sizes of rods, tubes and shapes available. Distributors will cut this warehouse stock long or short in exactly the length you need.

Round or symmetrically shaped bars and tubes, special alloys and longer lengths can be made to order.

MINUTE MOVIE...
HOW A BLOW-HOLE ALMOST LOST THE ORDER
A machine shop bought 32 lbs. of bronze in a 13" rough cast 3¼" bar.
After the bronze was on the lathe for three hours, the operator uncovered a blow-hole..
. scrapped the bar.
But all was not lost. The shop then ordered porosity-free Asarcon 773.
Since they could get exactly the length needed this was only 18½ lbs. (3" diam. x 8" long). Only 2½ hours of easy machining.
. . the part was shipped.
P.S. JOB SAVED . . . CUSTOMER SATISFIED

ASARCO
CONTINUOUS-CAST
RODS · TUBES · SHAPES ®

Send for this free catalog on Asarco Continuous Cast Bronzes. It contains physical properties, table of weights, photomicrographs, table of stock shapes and sizes and other data.

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American Smelting and Refining Company

OFFICES: Perth Amboy Plant, Barber, New Jersey
Whiting, Indiana

IRON AGE *introduces*

J. W. Lipphardt, appointed supervisor of quality control for WHEELING STEEL CORP's Yorkville Works, succeeding **Gordon S. Coleman** who was recently made assistant general manager of that plant.

Edward T. Brown, appointed special representative of the TOWNSEND CO., with headquarters in the general office, New Brighton, Pa. **Frank L. Brierly** was named Eastern division sales manager.

Emmett D. Quan, named manager of works, passenger car shops, of PULLMAN-STANDARD CAR MFG. CO., Chicago.

John R. Heming, appointed project engineer in charge of combustion control of the HAYS CORP., Michigan City, Ind.

Donald A. Keating, appointed as railroad division sales manager of TURCO PRODUCTS, INC., Los Angeles.

Richard T. Nalle, elected to the board of directors of the YORK CORP., York, Pa.

Joseph E. Busko, appointed a director of safety of the Nicetown, Pa., plant of the MIDVALE CO.

John R. Wanamaker, elected to the board of directors of HENRY DISSTON & SONS, INC., Philadelphia.

Joseph G. Surmacz, named to the newly created position of chief industrial engineer of HARNISCHFEGER CORP., Chicago.

William J. Freund, appointed advertising manager of NESCO, INC., Chicago.

L. R. Glass, joined PIONEER ENGINEERING & MFG. CORP., Detroit, in the capacity of personnel director.

Donald C. Kopp, placed on special assignment by the MONARCH MACHINE TOOL CO. Mr. Kopp will spend the next year in Europe and will be located in London.

Dr. Arthur W. Wishart, joined WESTINGHOUSE ELECTRIC CORP., as manager of a newly-organized glass manufacturing division. Dr. Wishart will be temporarily located in Fairmont, W. Va.

Gilbert Soler, appointed supervisor, research associates, on the department's research and development staff of the U. S. STEEL CO., Pittsburgh. **Andrew H. Brisse** has been promoted to research associate and **John H. Richards** has been named to the research and development staff.

John Seagren, appointed chief engineer, engine division, NATIONAL SUPPLY CO., Springfield, Ohio. **Harvey W. Hanners** and **George F. Noltein** were appointed chief research engineer and consulting engineer respectively.

John M. Auty, elected a vice-president and **William R. Koester,** secretary and treasurer of the PITTSBURGH SCREW & BOLT CORP., Pittsburgh. **Alexander I. Stayman,** appointed assistant to the president; **Thomas Toby,** assistant general manager of sales.

William A. Bauer, named director, foreign division of AMERICAN RADIATOR & STANDARD SANITARY CORP., Pittsburgh. **J. Phillips Cosgrove,** elected executive vice-president of the corporation.

Turn to Page 52

A. P. MILLER, elected vice-president in charge of operations of the Newport Steel Corp., Newport, Ky.

WILLIAM J. STEPHENS, appointed an assistant general manager of sales, Bethlehem Steel Co., Bethlehem, Pa.

WILLIAM M. MAYBERRY, appointed manager of sales, tin mill products division, Bethlehem Steel Co., Bethlehem, Pa.

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IRON AGE

salutes

Leslie B. Worthington

LES WORTHINGTON, chairman of the American Steel Warehousemen's Assn. is bringing new stature to an industry which distributes 20 pct of the nation's finished steel products.

He has a deep interest in the problems of the small manufacturer. As president of U. S. Steel Supply Co. he knows their needs. He's had 28 years of helping them over rough spots—finding more and better steels to help them do a better job.

Les started as sales apprentice for the old Illinois Steel Co. back in 1923. In 1941 he went to Pittsburgh to head up sales of bar, strip and semi-finished products for Carneigie-Illinois.

In 1942 Les became vice-president of U. S. Steel Supply Co. A year later he moved into the presidency. He's a leader and a doer. He knows how to express himself clearly in few words. He's willing to see the other fellow's point of view and when a decision is reached he wants action.

He's plain talking, down-to-earth, and takes his job seriously. He knows his product from furnace up. He's built a reputation for thoroughness. A customer's problem is a challenge, the kind of challenge Les is always ready to pick up. And he knows how to follow through until that problem is licked.

Les Worthington's pride is his family. He and his wife and their daughter Dorothy and two sons, John and Paul, make their home in Kenilworth, Ill.

CHARLES J. HARDY, Jr., elected chairman of the executive committee, combining that office with his present position as president of American Car & Foundry Co., New York.

GLEN A. WILSON, appointed general superintendent, carbide division of the Firth Sterling Steel & Carbide Corp., McKeesport, Pa.

J. F. ROBERTS, appointed director of engineering, general machinery division, Allis-Chalmers Mfg. Co., Milwaukee.

ALVIN R. KUDER, elected vice-president in charge of manufacturing of OPW Corp., Cincinnati.

IRON AGE *introduces*

Continued

Roger F. Dunn, elected secretary and treasurer of GRAVER TANK & MFG. CO., INC., Chicago, to succeed **B. B. McCandliss** who has been named senior vice-president.

George G. Herrick, joined the sales organization of CLEARING MACHINE CORP., Chicago.

A. J. Steffens, Jr., appointed sales engineer for the OSBORN MFG. CO., Cleveland. Mr. Steffens will cover the territories of N. Carolina, S. Carolina, E. Georgia and Florida.

Richard J. Dunne, appointed Eastern division sales engineer for the CRO-PLATE CO., INC., Hartford, Conn. **Clarke W. Clemmer, Jr.,** has been appointed Eastern division equipment engineer.

Gustav E. Lowe, appointed manager of the rate department in the general traffic office of KAISER ALUMINUM & CHEMICAL CORP., Oakland, Calif.

Paul S. Kempf, appointed manager of industrial relations of INLAND STEEL PRODUCTS CO., and will transfer to the Milwaukee headquarters of the company.

Herbert B. Clark, elected a director of FANSTEEL METALLURGICAL CORP., Chicago.

Leslie G. Hulbert, appointed manager of market development division of U. S. STEEL SUPPLY CO., Chicago.

William W. Fisher, Jr., named general manager of the instrument division of DAYSTROM, INC., Elizabeth, N. J.

John Fox, named representative of the A. O. SMITH CORP., welding products division in the greater St. Louis area.

A. J. Brosius, K. C. Cox, F. J. Lloyd, Jr., and **B. B. Reilly,** elected to the junior board of directors of DRAVO CORP., Pittsburgh.

William Grant, appointed field engineer by the LIVINGSTONE ENGINEERING CO., Worcester, Mass. Mr. Grant will represent the company in Missouri and S. Illinois.

Franklin I. Fickett, named sales engineer in Indiana, Ohio and Michigan for HUNT-SPILLER MFG. CORP.

Addison Maupin, appointed development engineer to specialize in the CHAS. TAYLOR SONS CO. refractory products, Cincinnati.

T. W. Potter, appointed mill and industrial representative, St. Louis, for E. C. ATKINS & CO. **George A. Hines** succeeds Mr. Potter in the Pittsburgh area.

George V. Dupont, appointed to the newly-created administrative post of manager-central engineering department, DIAMOND ALKALI CO., Painesville, Ohio.

Jack B. Weil, appointed director of public relations and advertising for CHRISTIANSEN CORP., Chicago.

Edgar H. Cummings, appointed chief engineer of the ROUND ASSOCIATE CHAIN CO.'s Cleveland.

C. H. Gosiger, elected a member of the board of directors of the DAYTON POWER & LIGHT CO., Dayton. Mr. Gosiger is the founder and president of the C. H. Gosiger Machinery Co.

Richard M. Davis, elected a director of ATLAS STEELS LTD., Welland, Ont.

George G. Raymond, Jr., named executive vice-president and general sales manager of the LYON-RAYMOND CORP., Greene, N. Y. **Christian D. Gibson,** promoted as vice-president in charge of engineering.

William H. Franklin, elected executive vice-president, **Oren H. Persons** and **Carl S. Vogel,** vice-presidents and **H. Lloyd Beyer, Jr.,** became a member of the board of directors of the EDGCOMB STEEL CO., Philadelphia.

Donald N. Watkins, elected chairman of the board and president of LACLEDE-CHRISTY CO., Pittsburgh. **Roy Erikson,** elected treasured and **Edward Williams** was elected comptroller and secretary of the of the company.

Anthony J. Zino, Jr., appointed domestic general sales manager of JOSEPH DIXON CRUCIBLE CO., Jersey City, N. J.

Warren Carhart, promoted to the position of supervisor of application engineering at the Lynwood plant of WESTERN GEAR WORKS.

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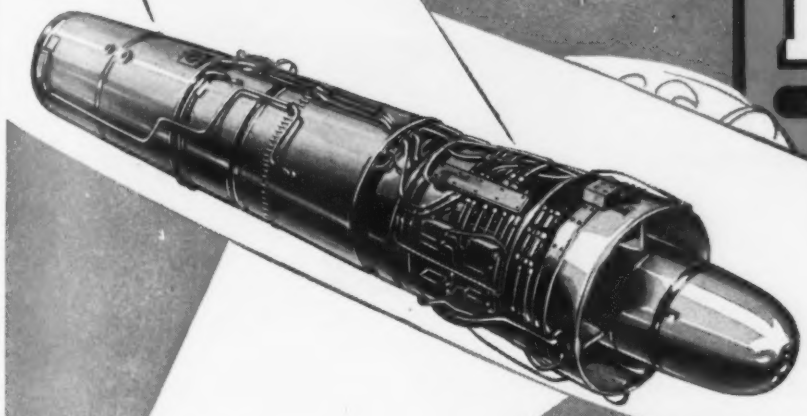
ALLOY STEELS



The use of N-A-X ALLOY STEEL in Aircraft Gas Turbines saves up to 50 per cent of critical Stainless Steel.

Conservation is possible – without sacrifice with use of N-A-X ALLOY STEELS

With the demand for greatly increased quantities of the critical and strategic Stainless Steels used in Jet Engines intensified by the acceleration of the building program, the Air Force requested the producers of these engines to seek *suitable* material with less critical alloy content to replace the Stainless Steel for certain moderate temperature application in these aircraft gas turbines.

The steel selected had to be of low-alloy content with high strength and good welding characteristics. Ordinary low carbon steel did not meet the requirements because of its low tensile properties and the fact that it could not be satisfactorily welded by the inert arc process, which is widely used in aircraft gas turbine manufacture.

The data available from tests made on several weldable low-alloy, high-strength steels indicated that N-A-X ALLOY STEEL was the most satisfactory of the group — *its selection followed.* Unlike other possible substitutes, N-A-X ALLOY STEEL has good low temperature impact values, maintains its higher strength and is not subject to temper brittleness in the wide operating temperature range required of the steel for this purpose — from a low of −70°F. to +800°F.

The use of N-A-X ALLOY STEEL for this application has cut the amount of Stainless Steel required in half. This is of considerable importance to the Air Force.

GREAT LAKES STEEL CORPORATION

N-A-X Alloy Division — Ecorse, Detroit 29, Michigan

NATIONAL STEEL CORPORATION

on the assembly line

automotive news and opinions

Auto materials quotas sliced again . . . Steel may limit output . . . Industry may need CMP help for final quarter output

by Walter G. Patton

Auto Quotas Set — Materials quotas set for the automobile industry for the third quarter are 65 pct steel, 60 pct copper and 50 pct aluminum. Base period is the first 6 months of 1950. Present government thinking is automobiles should continue to be built.

Trucks and service parts are expected to come under CMP in the near future. If controls prove too stiff and widespread unemployment occurs, the auto industry has been promised CMP assistance during the fourth quarter.

Governs Output—Steel is still the limiting factor in auto production. Major producers as well as independents are fighting hard to maintain existing schedules. Steel will dictate production during the remainder of this year at least.

Not as Optimistic—Present government thinking is that consumer goods production can be held during July-August-September at 65 pct of the base period for steel and at somewhat less for copper and aluminum. Automobile officials are less optimistic than government. At least one major producer is seriously concerned about steel for June.

On Unit Basis—There is a possibility the industry will find itself in a position where it will *have* to ask CMP for help in its fourth quarter schedules. If the industry should come under CMP, control will be on a unit quota basis rather than on the materials basis which is now used.

Unemployment Fears—Industry spokesmen agree a 65 pct steel allocation for automobiles will result in widespread layoffs. Government officials are sympathetic to the industry's viewpoint and will undoubtedly modify their present position if the industry can justify its position in terms of consumer demand.

New Determination — Original computations made in Washington of the adjusted base period for automobile production have resulted in widespread distortion of competitive positions. A new determination of the base periods "as adjusted" is now in process.

As long as industry controls continue on a materials base, these figures are academic. They will assume considerable importance if the industry comes under CMP.

Scrap Hunt Is Must—Production of steel during 1952 at a capacity rate may depend on scrap. Steel mills are just squeezing by now on scrap. New scrap sources must be found, the trade believes, if capacity steel operations are to be maintained. An organized and carefully integrated effort to get scrap is a "must" in the opinion of most astute industry observers.

Relax Controls Later?—There is some hope expressed by informed government officials that it may be possible to relax present controls on aluminum as early as next year. If production comes up to expectations, steel controls may be eased the following year, some sources believe.

Obviously, unforeseen international developments or failure to produce defense materials at the anticipated rate will necessitate significant changes in these forecasts.

Still 6.5 Million—Despite recent setbacks and clouded future, a forecast of 6.5 million passenger cars and trucks in 1952 still appears to be justified. This estimate presupposes the third quarter will fall more than 30 pct below 1950 passenger car production and assumes a drop during the fourth quarter of 40 pct.

Lower Profit Rate—The auto industry's contention that record-breaking profits vanish quickly in the face of curtailed production is justified by recent experience. Compared with earnings of 11.1 pct a year ago, the GM net on sales dropped to 7.2 pct of sales during the first quarter.

Chrysler earnings were at the rate of 2.13 pct of sales compared

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west coast progress report

digest of far west industrial activity

by R.T.Reinhardt

Scrap Dealers By-Passed—Western scrap dealers are increasingly bitter over Section 13 of Ceiling Price Regulation 5 which permits delivery of scrap by truck direct to consumer at ceiling prices plus a minimum of $2.50 per ton.

Considerable tonnages of iron and steel scrap are being delivered on this basis to smaller steel plants, leaving established dealers out in the cold. Major buyers are playing ball with dealers by allowing brokerage on truck deliveries.

It is pointed out this practice is conducive to up-grading and, on the other hand, to delivery of top quality scrap where not particularly needed.

More Ore Reported—Search for iron ore by Japanese steel plants and others has renewed interest in little known deposits in Nevada and Idaho.

A deposit near Beowawe, Nev., of unproved extent is said to average 62 pct Fe with some running high in phosphorus. Another deposit in southern Idaho reportedly is of commercial quality and of considerable extent. Both ore bodies are being explored more fully by prospective users and shippers.

Alaskans are attempting to interest the steel industry in a deposit of iron ore about 50 miles south of Juneau described by a mining engineer as covering 4 square miles and containing "more than three quarters of a billion tons of magnetite."

Alaskan Construction — Additional heavy military construction in Alaska will soon get under way. Low bidders on three projects last week were: J. C. Boespflug and S. Birch & Sons Construction Co., $3,167,262 for maintenance shops at Fort Richardson; Kunney-Johnson, $596,000 for field maintenance and artillery shop at Ladd Air Force Base; and Peter Kiewit Sons Co., $349,000 for special maintenance shop at Eielson Air Force Base.

A record construction program is expected to be in full swing by mid-June with workers already taxing living accommodations beyond capacity.

Boeing Needs Engineers—Even with more engineers on its payroll now at Seattle and Wichita than during World War II, Boeing Airplane Co. needs 800 more. Experimental projects, and the complexity of modern planes account for the need for more engineers now than during World War II.

Douglas Expanding — Douglas Aircraft Co., Inc., will build a $1.2 million addition to its Santa Monica plant where at least 3000 production workers will be added.

American Brake Shoe—Production capacity of approximately 100,000 railroad brake shoes per month is expected at American Brake Shoe Co. on completion of its new plant at Pomona, Calif. Construction is scheduled to start in July but no completion date has been set. Allocation of steel is yet to be made.

Water Rates — Observation of World Trade Week in the San Francisco Bay Area included a crack at prevailing rates between the West Coast and the Orient by shippers.

A. P. Heiner, traffic manager for Kaiser Steel Corp., pointed out that a substantial contribution to revival of shipping through San Francisco Bay would be a lowering of rates and elimination of "port handling charges."

East Coast Favored—He stated, ". . . On the majority of commodities shipped from the Pacific Coast to the Orient, rates are approximately the same as from the Atlantic Coast to the Orient."

"On 25 pct of commodities, the West Coast actually has higher rates and charges than those same products moving from the East Coast to the Orient. Shippers feel that the steamship rates from the West Coast to the Orient should be something less than the rates from the East Coast, to reflect the 5000-mile shorter haul and the absence of Panama Canal tolls," said Mr. Heiner.

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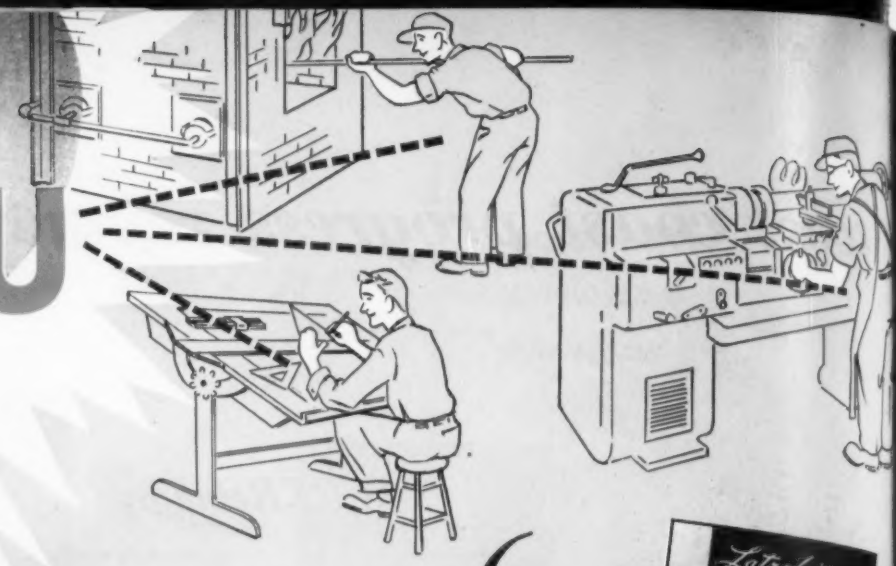

LATROBE DESEGATIZED* BRAND MOLYBDENUM HIGH SPEED STEELS

*Trade Mark Reg. U. S. Pat. Office.

The foremost problem facing the metalworking industry today stems from the critical shortages that exist in many raw materials.

Sudden shifts from the use of old and familiar to relatively new and unfamiliar materials are sometimes necessary, therefore, to overcome these shortages and still meet the demands created by expanding production trends.

To assist the possible new—and the old—users of its Desegatized Brand molybdenum high speed steels—Electrite Double-Six, Electrite Tatmo, Electrite TNW, Electrite MV Series, and Electrite HV-6—the Latrobe Electric Steel Company has carefully compiled guides to their proper selection and use. These guides, in the form of pamphlets illustrated at the right, are complete and contain up-to-date information on the analyses, forging, hardening, tempering, testing, recommended uses and the available forms of each of these steels. Get in touch with your nearest Latrobe representative for copies or write direct to the main office in Latrobe, Pennsylvania.

And remember . . . . Latrobe's Desegatized Brand molybdenum high speed steels are fully uniform and free from harmful carbide segregates. This quality—found in all Desegatized Brand steels—guarantees greater tool and die efficiency—an important factor in your production program today!

BRANCH OFFICES AND WAREHOUSES: Boston, Buffalo, Chicago, Cleveland, Dayton, Detroit, Hartford, Los Angeles, Milwaukee, New York, Philadelphia, Pittsburgh, St. Louis, Seattle, Toledo.

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LATROBE ELECTRIC STEEL COMPANY

LATROBE, PENNSYLVANIA

the federal view

this week in washington

by George H. Baker

Fast Writeoffs Slowed — Not only steel firms but other holders of fast tax writeoff certificates are receiving reminders from DPA to hurry up with filing their quarterly reports. This detailed and complete information is needed as a "guide to progress," DPA explains.

But it is more than that. The Defense Act provides that such tax concessions must be choked off when mobilization needs are met. Through the first week of May something like 1235 certificates had been issued, involving $5.5 billion in production expansion. Nearly 70 pct, or $3.8 billion has been accepted for tax writeoffs. Until these detailed reports are in, DPA is not certain just how close the expansion program may be to the limit imposed by Congress.

Since steel sets the pace, DPA is especially anxious to close the books in this industry. The agency is keenly interested in avoiding further charges of "favoritism."

Who Gets Contracts?—Lagging defense procurement is due for a needling from Capitol Hill.

Latest "Operation Hairshirt" for Pentagon buying officials is headed by Rep. Hebert, D., La., who thinks procurement of arms and material and construction of bases has bogged down unnecessarily.

Close Look Slated—Hebert and his subcommittee (branch of the House Armed Services Committee) also plan to investigate all contracts for material and construction, whether bid or negotiated. It will take a close look at procurement policies of the Army, Navy, and Air Force, and the extent to which the three branches coordinate buying.

Whole move is a reflection of Congressional concern over the Pentagon's vague "unfilled orders" category. One of the commonest questions to turn up in Capitol mail these days is the "I've-been-reading-about-these-orders-but-I-can't-get-any-myself" kind of letter from small firms. Hebert's subcommittee plans to find out why not.

Protest Freight Bill — A new campaign against legislation (S. 719) permitting manufacturers to absorb freight charges is getting under way in the Senate.

Concerted protest is being organized by Senators Kefauver, D., Tenn., and Magnuson, D., Wash., in an attempt to whip up new interest in the upper chamber on the grounds that the bill would strip the Federal Trade Commission of its enforcement powers.

Freight absorption, made in good faith to meet the equally low price of a competitor, would once more become a lawful practice under the provisions of the bill now before the Senate.

"Immunity" From the FTC—But Kefauver and Magnuson predict that this "good faith" clause would render business "immune" from cease-and-desist orders issued by FTC. The bill would repeal the laws against discriminatory selling, they claim.

Although President Truman has already gone on record as being opposed to legislation of this type, the Senate believes S. 719 is important enough to industry to warrant passage during the present session.

Labor Growing "Critical"—Manpower shortages not only threaten, but already are showing up. (See story on p. 85.)

Tightening situation particularly applies to metals and metalworking fields, especially with regard to skilled and professional work. In these fields, employment as a whole has risen by one-third within a year and the average worker is now putting in 2 hr overtime each week.

Confiscation Insurance Set — American business has been increasingly skittish regarding investments abroad, and understandably so in view of the increasing trend to state confiscation of industrial property. In their zeal to promote President Truman's Point 4 program and industrial assistance by American investors, the Marshall Planners have come up with a new gimmick — government guarantee against loss by "expropriation," or, any other type of seizure by the foreign land where the property is located.

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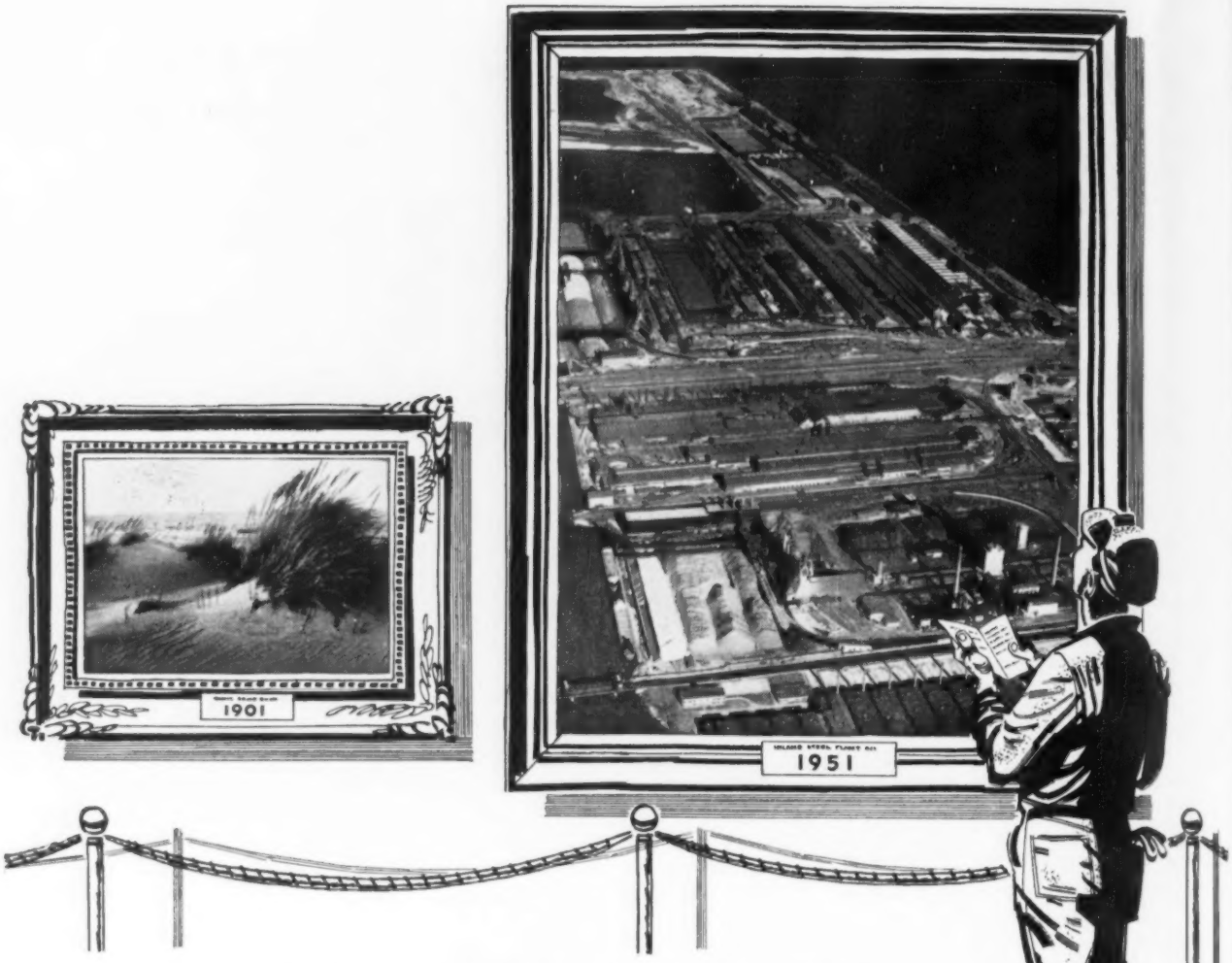

Here is a picture you helped us to paint

This month of May marks an important milestone in our relationship with you. It's the 50th birthday of our Indiana Harbor works.

Naturally we're a little proud of the growth of "The Harbor" from a sandy wasteland to an efficient steel-making facility. But, more than that, we're grateful to you . . . our customers, suppliers and friends . . . for making the growth possible.

So, without the usual anniversary platitudes, we say sincerely, "Thanks."

(By the way . . . the picture on the right is rapidly becoming obsolete as we further expand our ingot producing facilities by another 20%).

INLAND

INLAND STEEL COMPANY • 38 S. Dearborn Street, Chicago 3, Illinois

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Principal Products: Sheets, Strip, Tin Mill Products, Bar Mill Products, Plates, Structural Shapes, Floor Plate, Piling, Reinforcing Bars, Rails and Track Accessories, Pig Iron, Coal Chemicals.

THE IRON AGE
FOUNDED 1855
FEATURE ARTICLES

CONTROL SALT BATH WHEN HEAT-TREATING High-Speed Steel

PART I

By J. G. Morrison
Chief Metallurgist
Landis Machine Co.
Waynesboro, Pa.

Depending on analysis, condition, and method of rectification salt baths may have varying effects on high-speed steel during heat treatment. A simple test helps predict whether decarburization or carbon pickup will occur, and whether steel is unduly soluble in the bath.

The chemistry of the superheat salt bath is not well understood. To date there is no adequate correlation of the bath analysis with actual surface carbon chemistry. There are several methods for rectification of the superheat bath, but there is little agreement as to the relative merits of the methods. It is quite probable that local conditions may determine whether any of the several methods of rectification may produce the results desired.

At 2325°F, even the effect of variations in the chemistry of the ceramic pot lining are not to be excluded. One may, from necessity, have to treat high-speed steel containing some mill scale, which would present problems not encountered in a bath from which mill scale was excluded. Thus the data in this article may be influenced by conditions natural to the equipment used and are not necessarily entirely applicable to another installation.

Silica has been used for some time in the open electrode furnace. The oxides, principally those of iron and barium, form silicates which fall to the bottom of the pot as a sludge. Removal of the sludge by means of a perforated sheet steel scoop is required several times a day. With only the addition of enough fresh salt to compensate for normal dragout, there is a steady increase in alkalinity. Also, there is a progressive increase in the amount of silica held in solution.

There appears to be no increase in decarburization with the increase in akalinity, provided more than ample silica is used and sludging assiduously carried out. But there is an increasing solubility of the high-speed steel in the salt. At high oxide or high silica contents, the erosion or solution loss may be ruinous to precision tools. To correct this condition resort is made to periodic ladling out of some of the salt and the addition of fresh salt.

Total alkalinity is determined on a 5-g sample

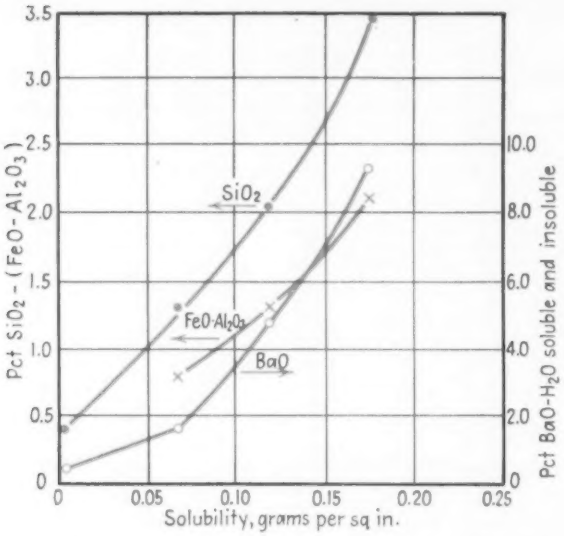

FIG. 1—Solubility of 18-4-1 steel in an open electrode silica rectified bath.

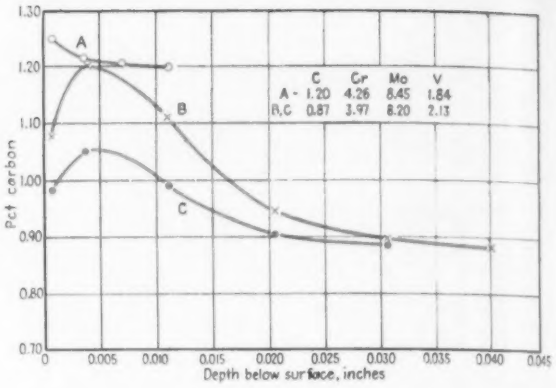

FIG. 2—Surface carbon distribution of high-speed M-10 steel carburized at 1650° and austenitized at 2375°F in silica-rectified salt bath, compared with steel melted to approximate the high surface carbon of the precarburized samples.

Control salt bath (continued)

of salt heated in boiling water, titrated when cold with N/10 hydrochloric acid. It is usually calculated to percent barium oxide. The term alkalinity is actually a misnomer, for it presumes, in the case of rectification with silica, that the bath is alkaline. However, the highly acidic character of silica at high temperatures leaves little doubt that the bath in the neighborhood of 2325°F, with an excess of silica, is acid in character. Chemical action does occur on titration with hydrochloric acid but it is erroneous to assume that such apparent alkalinity maintains at superheat temperatures.

An 18-4-1 high-speed steel is quite tolerant of acidic conditions but most intolerant of alkaline conditions. If one liquid carburizes 18-4-1 steel at 1650°F in a salt containing alkali cynanide, the surface attack is considerable after 1 hr. At a temperature of 2325°F, alkalinity would be almost catastrophic in effect.

All baths sampled at 2325°F

In all the analytical tests made on the barium chloride superheat bath for this report, the bath was sampled at a temperature of 2325°F.

Fig. 1 shows the relation of the silica held in solution with increasing alkalinity as calculated to barium oxide, and the solubility of the bath for 18-4-1 steel relative to the barium oxide and/or iron and aluminum oxides.

The 18-4-1 specimens were ground and weighed, then preheated at 1550°F for 5 min and austenitized for 2 min at 2325°F. Specimens were then quenched, washed, and polished to a metallic luster. Then they were again weighed. The solubility of 18-4-1 steel in the bath is proportional to the barium oxide and/or silica and other oxides.

A solution loss of 0.06 g per sq in. will hardly be noticeable on precision tools, but 0.17 g per sq in. is ruinous because of adverse effect on the tool geometry.

In a bath started with new salt, 50 pct anhydrous barium chloride and 50 pct barium chloride with 1 pct silica, run continuously at 2325°F, the calculated barium oxide increased from 0.50 pct at 8:00 a. m. to 1.1 pct at 4:00 p. m. of the same day.

Strip tests for surface carbon were run on 18-4-1 steel in baths at three stages of age and condition. One was a freshly prepared bath to which 0.50 pct silica was added, one was the same bath after a month's use, and the third was the same bath at its supposedly poorest condition, when the calculated barium oxide had reached 3.06 pct. There was no indication of

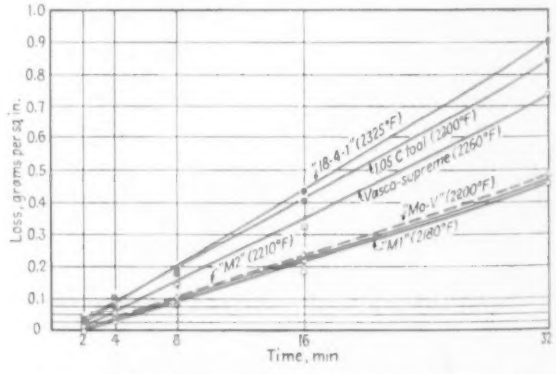

FIG. 3—Solution loss of various high-speed steels when hardened from an open electrode salt bath.

decarburization. If anything, there was some indication of a slight carbon pickup in some cases.

The effect of similar time and temperature cycles on the surface carbon chemistry of a 1.03 pct carbon tool steel was quite considerable decarburization. But none of the carbon tool steel samples showed any total decarburization at the surface, the solution of the steel in the bath probably compensating. Small samples cut from the superheated bars and then

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TABLE I

CARBON IN 18-4-1 STEEL FROM VARIOUS BATHS

Bath Rectification	Pct Carbon: Annealed	Austenitized 2325°F: 2 min	4 min	8 min	Solubility Metal in Bath, gm per sq in.: 2 min	4 min	8 min
Graphite Rod-Methyl Chloride	0.75	0.74	0.71				
	0.755	0.75	0.71				
	0.75	0.74	0.725				
Silica	0.74	0.74	0.75	0.76			
	0.735	0.73	0.745	0.755			
	0.725	0.735	0.73	0.74			
	0.71	0.725					
	0.72			0.735			
Silica—New Shell							
7 days old	0.73	0.72	0.735	0.725	0.003	0.006	0.014
10 days old	0.745	0.74	0.74	0.755	0.006	0.011	0.022

silica rectified bath was determined. Specimens were weighed, preheated at 1550°F, and austenitized. Similar specimens of 1.03 pct carbon tool steel were run at a temperature of 2200°F. All specimens were oil quenched, washed, and polished to a metallic luster, then again weighed. Fig. 3 shows the relative solubility in the silica rectified-open electrode bath containing a calculated barium oxide of 2.05 pct. The solubility is proportional to time and temperature for the several high-speed steels.

A popular method of bath rectification of the submerged electrode superheat salt bath furnace is to use 2-in. diam graphite rods held

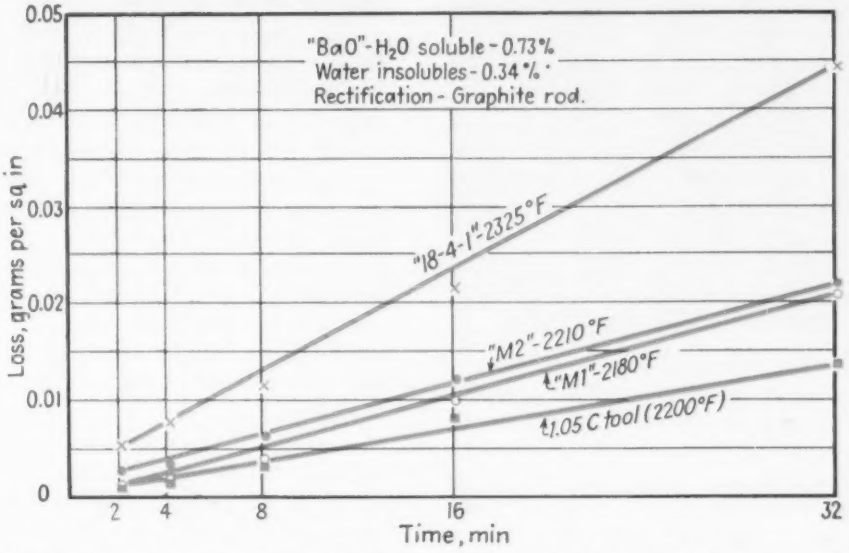


FIG. 4—Solution loss of various high-speed steels hardened from salt bath with totally-immersed electrodes.

conventionally hardened and quenched had a hardness greater than that of the annealed and conventionally hardened steel. This is not unusual as the degree of decarburization approximates the eutectic composition at the surface.

The test on the carbon tool steel was run to determine its rate of decarburization relative to 18-4-1 steel. Experiments concerned with the controlled carburization of annealed high-speed steel prior to austenitizing have indicated that the carbon of the iron carbide, formed in carburizing, is quite fugitive when the steel is treated at superheat temperatures.

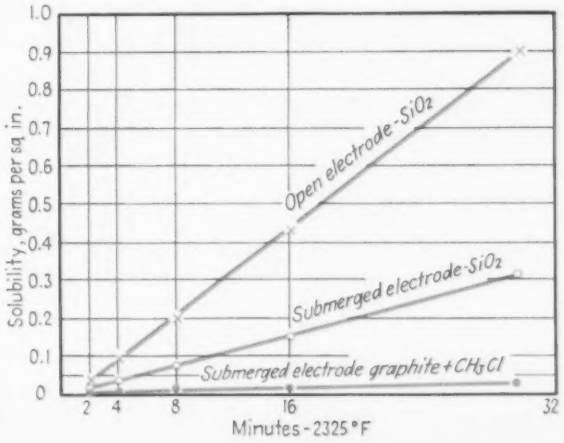
Fig. 2 shows the relative fugacity of the surface carbon of liquid carburized and subsequently austenitized M-10 molybdenum-vanadium steel compared with the same type steel melted to the same approximate surface carbon content. The M-10 melted to 1.20 pct carbon shows a carburization of the resulting austenitized surface; the synthetic 1.20 pct carbon M-10 steel shows decarburization.

The solubility of various high-speed steels in the salt contained in the open electrode-

FIG. 5—Relative solubility of 18-4-1 steel specimens in open electrode and submerged electrode salt baths, with silica and graphite rod-methyl chloride rectification.

below the surface for about 1 hr, at 2250°F, for every 5 hr of operating time. The graphite rod reduces the metallic oxides, and the metal, principally iron, is deposited on the rod as carbide globules. After removing and cooling the rods, the globules of iron carbide may be scraped off and the rods reused.

To reduce the barium oxide, recourse has been made to the use of methyl chloride gas which is led into the bath by a pipe extending below the surface. Some baths have recesses in the pot wall for leaving a submerged graphite rod in the bath during production use.



Control salt bath (continued)

The chief benefit to be derived from graphite rod-methyl chloride rectification is the relative freeom from sludge. An objection to this method of rectification is the considerable lost time due to the rectifying periods. Another objection is that the bath tends toward the decarburizing side, more and more, as the hardening period is extended after rectification.

Using a submerged type of electrode furnace and graphite rod-methyl chloride rectification, an extremely low order of solubility of high-speed steel in the bath is found when the bath in a new shell is only several weeks old and the calculated barium oxide content of the water-soluble portion of the salt is 0.73 pct.

Fig. 4 shows the solubility for some of the same high-speed steels, using same time and temperature cycles as in Fig. 3. The scale of Fig. 4 is 1/20 that of Fig. 3. The most unusual shift was that of the carbon steel specimens which showed a lower order of solubility than any of the high-speed steels. From the examination of Figs. 3 and 4, one might infer that pure barium chloride would be quite neutral as regards the solubility of high-speed steels.

Simple test used

A simple test has been used by the Landis Machine Co. for the past 2 years as a control of the quality of work produced as regards pitting and solubility, and as an accurate gage of the neutrality of the bath as regards carburization or decarburization.

In this test flat 18-4-1 hacksaw blade steel is ground to 0.010 in. thick by removing equal amounts of the metal from each side. An approximate half carbon factor catch weight is cut off and analyzed for carbon. Another sample is cut and a 0.040-in. hole drilled in it.

After weighing it is austenitized at 2325°F for 2 min and quenched. The sample is examined for any pitting. It is then dried and weighed and the solubility determined in grams per sq in. After weighing, it is tested on a Superficial Rockwell tester. The sample is then crushed in a mortar and analyzed for carbon.

The carbon content of the hardened portion compared to that of the annealed portion is an accurate measure of the neutrality of the bath regarding the surface carbon chemistry. The use of the thin 18-4-1 strip with the highly exaggerated superheat time furnishes a quantitative measure of the bath as regards its tendency to carburize or decarburize.

The results of some of these simple tests are shown in Table I. A comparison is made of the submerged electrode bath using graphite rod-methyl chloride rectification, and silica rectification. The graphite rod-methyl chloride rectification samples show a slight tendency toward decarburization; the silica rectified samples show a slight tendency toward carburization.

Fig. 5 illustrates the relative solubility of 18-4-1 specimens austenitized in the open electrode silica rectified bath, the submerged electrode-silica rectified bath, and the submerged electrode-graphite rod-methyl chloride rectified bath. The solubility which occurs in the graphite rod-methyl chloride rectified bath is quite insignificant. The greatest solubility occurs in the open electrode furnace. The solubility of 18-4-1 steel in the submerged electrode-silica rectified bath is greater than that of the graphite rod-methyl chloride rectified bath, but the erosion or solubility is well within manufacturing tolerances.

Neutral baths hard to control

The ideal superheat salt bath would be one that would not cause any decarburization or surface oxidation at all, the high-speed steel would be insoluble in the bath, and the furnace would never wear out. As such perfection is not achievable, a condition which permits of a harmlessly slight erosion or solution plus a slight tendency to carburization would appear desirable. A bath almost neutral as regards solubility is perhaps more sensitive to slight variables in the bath composition as concerns a tendency to decarburization. A bath in which some controlled erosion or solution occurs is desirable.

A slight carburizing potential appears in a submerged electrode bath properly rectified with silica. This is attributed to the minute amount of oxidized surface carbon being absorbed by the resulting tool surface. The oxidation of steel under certain circumstances is known to result in a slightly higher surface carbon, after removal of the scale.

Part II of this article will appear next week

The following general precautions should surround the use of salt baths for the hardening of high-speed steel:

1. *The baths should be as simple chemically as possible.*
2. *Clean steel should be processed through the baths. Work containing soil or mill scale should be avoided.*
3. *The salts should not pit the steel to any appreciable extent.*
4. *The solubility of the steel in the bath should be of a low order.*
5. *The use of nickel or high nickel alloys as electrodes, thermocouple protection tubes or fixtures should be avoided as there is a tendency for the dissolved nickel to plate onto the work and some fusion of sharp corners or projections may occur.*
6. *The bath should show little if any tendency to decarburize the high-speed steel.*
7. *The salt adhering to the surface of the quenched tools should be relatively easy to scrape off between room temperature and about 500°F to facilitate straightening where required, and it should dissolve with relative ease when washed in water.*
8. *The pyrometry of the superheat bath should preferably be of the "electric eye" type with a ceramic target tube.*
9. *Dragout from the superheat bath should be of such quantity as to allow for significant additions of fresh salt.*
10. *The superheat bath should be properly rectified.*

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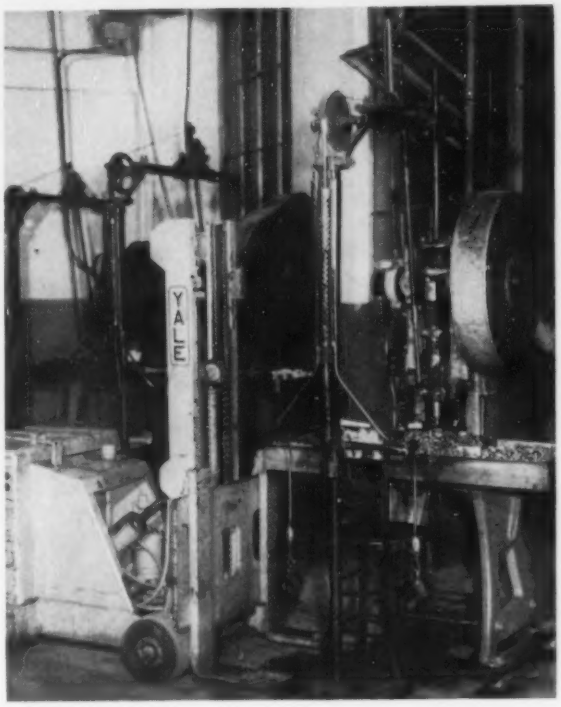
Making machinery mobile adds flexibility, cuts vibration

The United-Carr Fastener Corp., Cambridge, Mass., has made its production machinery mobile by mounting it on permanent, rubber-cushioned pallets. The incessant vibration caused by much of their equipment has been eliminated. Such vibration is one of the factors that tends to weaken factory buildings over a period of time.

In line with normal practice, machine tools at United-Carr used to be bolted to the floor, but now each unit has its individual pallet. These pallets rest on six hard rubber pads. Not only do the pads absorb vibration, but they also prevent the machine from "walking" or getting out of line. The pallet makes it possible for a fork truck to insert its lifting arms under a tool and either hoist or move it away.

When it is necessary to rebuild such things as dies or have a general repair job done, the equipment involved can be easily transported to the maintenance shop with minimum disturbance of production. Also, if a machine not being used in one department is needed in another production line, it is a simple task to transfer it. There have already been examples of where this palletizing of machinery has made it possible to bring production tools to a job or hard-to-move material.



PALLETIZED MACHINE TOOLS are easily picked up by a fork truck for transportation. Mounting the pallet on hard rubber cushions substantially reduces vibration.

Plastic-lined drum takes 55-gal loads

A FIBER DRUM, plastic envelope and closure disc, a reinforcing boot, steel lid ring and gasket are the components making up the new drum developed for shipping liquids in 55-gal lots.

With 50 to 75 pct less tare weight than conventional containers, a new fibre drum with an inner plastic envelope and protective boot is now being used to ship non-corrosive, non-flammable liquids in quantities as high as 55 gal. The new container was developed and is being licensed to users by Rhom & Haas Co. This company does not produce the drum's components nor assemble them. All are purchased and then assembled by the user.

A 55-gal fiber drum made by Continental Can Co., Inc., forms the exterior of the new container. A separate, polyethylene envelope is allowed to overlap the top chime of the drum. The film making up the envelope is a product of Visking Corp., and the conversion of the film into envelopes is done by Shellmar Products Corp., Kellogg Container Div., U. S. Envelope and Hedwin Corp.

Pinching, undue stretching or other damage to the envelope is prevented by the boot, which is extensible about 25 pct in any direction. Made by Cincinnati Industries, Inc., the boots are placed between the plastic envelope and the drum, extending upwards some 10 to 12 in. from the bottom. A rubber gasket and a plastic disk seal, together with the lid, make it possible to open and re-seal the container repeatedly.

Before using the new drum, users must obtain clearance from regular classification units regulating truck and rail shipments.

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DIES HARDFACED WITH ALLOY last longer

by Arthur Gray
Field engineer
Haynes Stellite Div.
Union Carbide & Carbon Corp.
New York

Hardfacing with a nickel-base structural alloy mainly used for high-temperature aeronautical and heat-treating applications has multiplied forging die life. The alloy has been used in steel mills for rebuilding hot shear blades, shafts, dies, entry guides and the bearing surfaces.

During the past few years there has been an increased demand for steel forgings that contain relatively large amounts of alloying elements. Due to their high-alloy content these steels must be worked at considerably higher temperatures and pressures than ordinary steels. As a result, forging, shaping, and trimming alloy steels brings about an increase in the rate of die wear.

First used in shell production

In many shops, this problem has been solved by hardfacing die surfaces with Hastelloy alloy C. This nickel-base alloy was first used in this way during the last war to protect nosing and forming punches for steel shells. Until then the main use of the alloy was as a structural material for equipment handling corrosive materials. It now has wide use as a hardfacing material for hot-working applications.

For instance, about a year ago an eastern manufacturer appropriated $1000 to replace a large forging die that, it was thought, had been worn beyond repair. The contour and part line of the die had washed away, and, since it had been reconditioned several times, it was felt that the die could no longer be brought back to size. Before the order was placed, however, the Die Sinking Dept. decided to experiment. The die was recut to a depth of 1/32 in. and rebuilt with a 1/16-in. deposit of Hastelloy alloy C, arc welded on the contour and part line. The die was machined to size and placed back in service.

Recent inspection showed that the die is still in excellent operating condition and has out-performed a new one. The total reconditioning cost was $75, a net saving of over $900.

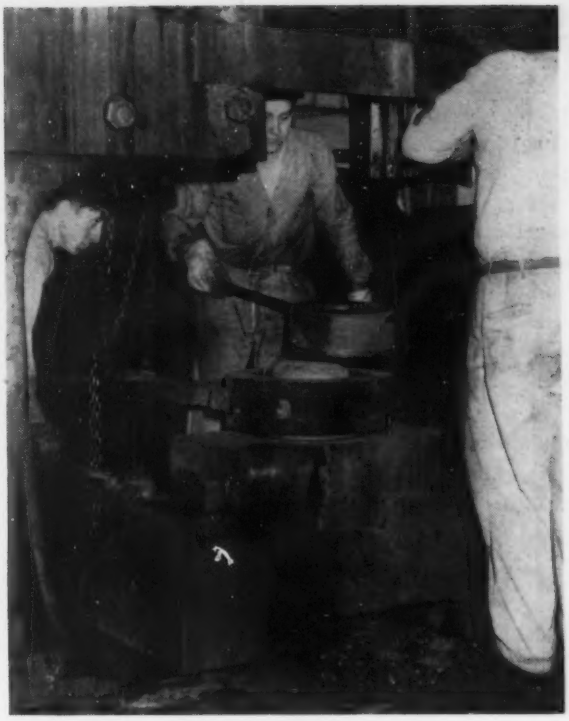
This same manufacturer also successfully salvaged a multiple-cavity die. In this instance, a 1-in. section had been broken out between two impressions. The die was repaired with the same nickel base alloy and has since produced more than 57,000 pieces before requiring further reconditioning.

Forms six times more pieces

Another forge shop has made use of the same material in facing the cutting edges of trimmer dies used for spring harrow teeth. Ordinary boiler plate is used as the base material for the die. Such dies have trimmed as many as 60,000 pieces before they require resharpening. A run of 10,000 pieces on an ordinary die has been considered good service before hardfacing was adopted. The spring steel teeth are at about 1600°F when trimmed.

In Toledo, Ohio, a firm that produced oil well equipment has also found it economical to hard-

TRIMMER DIES have lasted 15 times longer when hardfaced. An inexpensive base material can be used.



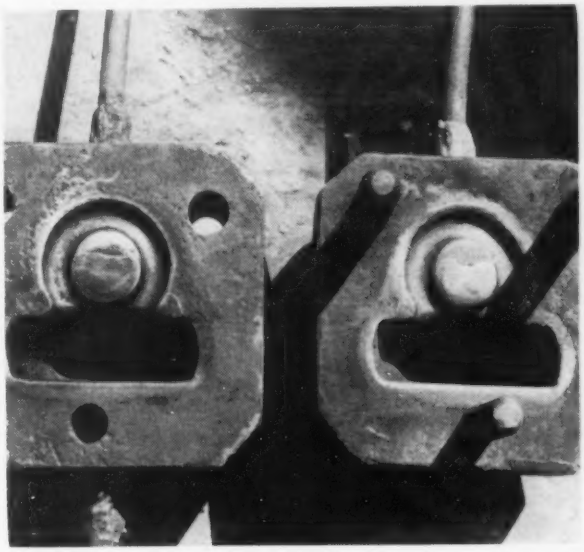
WEARING SURFACES of forging rings used to size steel billets are protected with a deposit of nickel-base alloy.

face forging dies. One of their products is oil well pump sucker rods. Each of these rods has a square wrench fit for making adjustments during the operation of a well. In forging the rods it is especially important that the wrench squares be consistent in size. Dies not hardfaced produced from 9000 to 10,000 joints before they had to be scrapped. When they were protected with the nickel-base alloy, they worked an average of 28,000 to 32,000 pieces. After they finally did go out of size they were rebuilt and used again. Forging was done at about 2200°F.

Duplicating pad-eye forging dies

1) *Two die blocks of SAE 4140 steel are heated to 1950-2200°F.*
2) *A heat-treated tool steel hob is pressed into one die to form half of impression. Hob is reversed and pressed into other die to the balance of depth for impression desired.*
3) *Die blocks are normalized at 1700°F.*
4) *Scale is removed by grinding from area to be welded. Dies are then preheated to about 400°F. and hardfaced around impressions with Hastelloy alloy C. Welding is done with dip-coated electrodes. Excess weld metal is removed by milling.*
5) *Hob is reassembled in the two impressions and dowel pin holes are drilled.*
6) *Dies are heat-treated with oil quench from 1600°F. and tempered at 500°F. Handles are attached by welding.*

An increase in service life of about 40 to 1 was brought about by hardfacing a piercing punch with Hastelloy alloy C. The punch was used to pierce a 1¾ in. diam hole in a bushing of chromium-molybdenum nitriding steel. Because the hole was 4½ in. long the punch had to be water cooled. Severe thermal shock caused steel punches to chip and spall. After punching about 100 pieces they could no longer be used. When hardfaced they handled from 3000 to 4000 pieces before requiring further resurfacing. One of the features of this job was that after facing, the deposit could be finish-machined in 15 minutes.



TWO HALVES of a pad-eye forging die which have been hardfaced with Hastelloy alloy C.

Dies hardfaced (continued)

At one time, thermal shock was a problem on piercing punches for 75 mm shells at an Indiana forging concern. Due to the length of the hole punched, the assembly had to be quenched in water after every operation to cool it off. Tool steel punches were buffed after every 150 shells and were scrapped after a run of about 450. When some of the scrapped punches were rebuilt with the nickel-base alloy they were able to handle 2000 shells. These same punches required buffing only after each 500 runs.

A description of how a shop on the West Coast makes dies to duplicate pad eye forgings is given in the accompanying box. The heat-treating in this instance was to obtain good strength in the base material of the die. An alloy C deposit has a Brinell hardness of about 210, as deposited. It is machinable in this form. There is rarely any need to peen such a deposit for it will harden in service. In use, the alloy work-hardens to about 325-375 Brinell and has excellent resistance to chipping and spalling.

The fabrication procedure for trimmer dies and punches at the same shop is relatively simple. These are cut from SAE 4140 steel with an oxy-acetylene torch or a band saw. Then they were preheated to 400° F and faced on the cutting edge with alloy C. After milling to accurate shape, they are checked with the forging die and put into service. The same general procedure is used for hole punches.

This same alloy is also being used in steel mills for facing blooming mill hot shear blades, entry guides, twist guide rolls, angular type guides and dies and shafts. In these applications, hardfacing has increased the life of parts by 10 times or more. One large steel company has successfully protected bearing surfaces of a blast furnace bell and hopper and also bleeder valves by hardfacing them with this alloy. They have shown no signs of wear in over two years' operation and are expected to last for many more despite increased top pressures and temperatures.

NEW BOOK

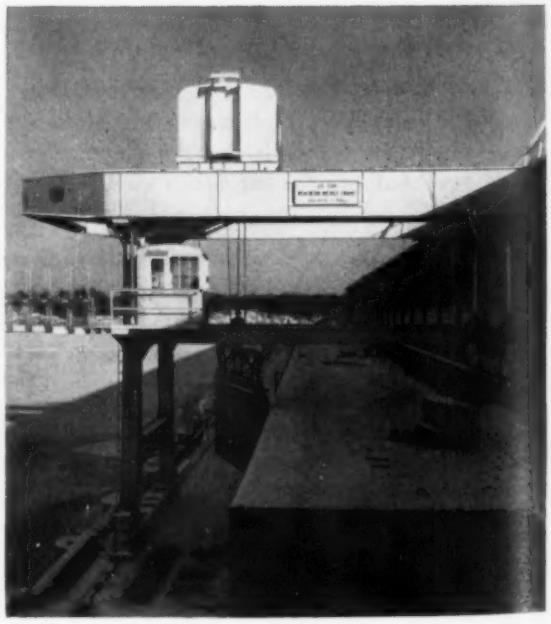
"Metalworking Lubricants," by E. L. H. Bastian, provides a comprehensive and practical coverage of all types of fluids and compounds used to facilitate metalworking processes. The nature, selection and application of lubricants and fluids are thoroughly discussed. Those used in forming non-metallic engineering materials, such as plastics, are also analyzed. Though it deals primarily with practical shop and plant aspects, the book also includes technical and theoretical explanations of the problems involved in the use of metalworking fluids and lubricants. McGraw-Hill Book Co., 330 W. 42nd St., New York 18. $6.00. 358 p.

CRANE AUTOMATICALLY ENGAGES, DISENGAGES LOADS

Until its new, 25-ton gantry crane was erected, the Hydro-Electric Power Commission of Ontario had to employ a second man to walk along the headworks underneath the old crane. The worker's job was to retrieve the rope used with the hooks previously employed. The job was a dangerous one, because it was necessary to work close to slots over running water under hazardous conditions. In winter, snow and ice made the footing precarious.

Now trash rack sections (see photograph) and emergency gate logs are lifted by a follower, which hangs on the main hook. The follower is fitted with latches or hooks which automatically engage the gate or other item being lifted.

The manufacturer of the crane, Dominion Crane Co., developed a special torque motor drive connected with the latch system so that the rope is kept taut at all times. During hoisting, for example, a light tension is maintained on the rope, so that retrieving is automatic.



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SUPER PRESSURES, DIRECT ORE REDUCTION

feature AISI MEETING

Steelmakers left the details of their largest steel expansion program in history to their lieutenants last week and gathered in New York for the 59th annual meeting of the American Iron & Steel Institute. The 2-day meeting, May 23 to May 24, at the Waldorf featured four technical sessions the first day.

Dr. Percy W. Bridgman opened the meeting Wednesday morning when he delivered the Charles M. Schwab Memorial Lecture. Dr. Bridgman, of Harvard, spoke on the "Properties of Materials Under Super Industrial Pressures."

Dr. Bridgman described the laboratory work that has been done on this subject and pointed out that it was done with little thought to practical application. However, he told the meeting that industry may sometime want to employ such stresses and that the subject was not exclusively of academic interest.

He traced our knowledge of the new range of stresses by citing the behavior of pressure vessel steels where the inner linings are often plastically strained and given a permanent set so that when pressure is released the external layers of the vessel hold the inner layers in compressive stresses.

300,000 Psi Working Pressure Used

The work on artillery pieces done during the first World War was also reviewed in which pressures used in gun stressing ranged up to 150,000 psi. Dr. Bridgman revealed that in his own work he has found the useful working limit to be at about 300,000 psi maximum.

The spectacular ductility which is produced by high pressures was cited. Under supporting pressures of 400,000 psi steels which normally fracture in tension with a reduction of area of the order of 50 pct will permit indefinite large reductions after having been treated at the high pressures. He cited the case where one such specimen was drawn to a reduction of area of 99.7 pct or an elongation at the neck of fracture of 300-fold prior to fracture.

Dr. Bridgman compared the ductility curves and strain hardening curves of steel and showed that they are independent of each other and the fact that they are both linear could not have been predicted. Under ordinary conditions steel work hardens as it is stretched and much of the work done at Harvard was to learn how hardening behaves under greatly increased elongations made possible by fracture.

The speaker reported that drawing processes have been conducted under pressure as high as 400,000 psi and that the wires produced had ultimate strengths as high as 600,000 psi. However, this wire was so brittle that it could not have any possible industrial application. Although most of the data presented were of academic interest, it is believed that this field investigation will eventually find practical application and use in the working of metals.

Walter S. Tower, president of the American Iron & Steel Institute, gave his annual address before the general meeting on Wednesday. He cited the current production rate of 107 million tons of ingots and called attention to the fact that steelmaking capacity is being increased on

EDWARD L. RYERSON, Inland Steel board chairman, receives the Gary Medal from Eugene G. Grace, Bethlehem Steel chairman, in recognition of his leadership in the industry and in his community and particularly for the part he has played in revamping the steel industry's public relations.

an unprecedented scale. Mr. Tower expressed the belief that the greatest concern at this time is on the danger of bureaucratic controls, rather than the amount of steel left on the free market. He told the meeting that the 1951 output of consumer durable goods will compare favorably with any prewar year except 1950.

The industrial relations session, held Thursday afternoon, attracted a large audience and was built around the theme, "How Industrial Relations Can Contribute Toward Maximum Productivity." Discussions were given by high ranking representatives of management. The Honorable Richard M. Nixon, U. S. Senator from California, delivered the address at the formal dinner held in the Grand Ballroom of the Waldorf Thursday evening.

Four major technical sessions were held on the afternoon of May 23. These sessions covered steelmaking, sinter, raw materials and plant operation. Chief interest expressed by members attending the steelmaking session concerned two papers, "Oxygen as a Means of Increasing Bessemer Production," and "Direct Reduction of Iron Ore Using the Fluidized Solids Technique." W. G. McDonough, superintendent, Openhearth and Bessemer Dept., National Works, National Tube Co., reported on the oxygenated blast used on a 28 net ton acid bessemer converter at the McKeesport, Pa., plant.

The main purpose of this investigation was to melt as much additional scrap as possible in the bessemer converter. From the experience gained in this project, which lasted 2 months, Mr. McDonough believes that oxygen offers a practical means for melting additional scrap to increase ingot tonnage when a deficiency of hot metal exists in a plant having both openhearth and bessemer steelmaking facilities. By the use of 4000 to 6000 cu ft of oxygen per blow, the normal steel scrap charge in a 60,000 lb blow can be increased about 4000 lb. This replacement of 4000 lb of hot metal by scrap makes that much more hot metal available for liquid openhearth charging, thereby increasing both openhearth and bessemer ingot tonnages.

Blowing time using the oxygenated practice can be decreased about 1 min per blow. A definite relationship between hot metal, scrap and oxygen usage was found, beyond which it did not pay to go except at the expense of quality, ingot yield and costs.

To date more than 2900 oxygenated blows have been made which have consumed about 6000 additional tons of scrap and have used approximately 15 million cu ft of oxygen. There have been no difficulties encountered from the blowers point of view regarding flame characteristics and temperature reading. The life of the converter bottoms and linings have shown no adverse effects. The scrap charge used consisted mainly of bloom crops with some skull scrap and broken ingot molds.

All types of bessemer steels have been made including rimmed, capped and killed. Mr. McDonough reported that the oxygen practice had not been harmful to steel quality and no effect on the nitrogen content of blown metal or finished product is evident from the various volumes of oxygen used in the experiment.

SPEAKERS' chat. Left to right, Walter S. Tower, AISI president; Charles M. White, president of Republic Steel, and Elton Hoyt II, Pickands Mather & Co., pose for a picture before the directors' luncheon on the second day of the meeting. Mr. White had just made a talk on capital requirements and productivity which he suggested would throw quite a scare into his hearers. It did. Mr. Hoyt's address outlined the industry's expanding ore needs.

Messrs. M. Tenenbaum, control metallurgist, and C. M. Squarcy, assistant superintendent, blast furnaces, Inland Steel Co., delivered the paper on "Direct Reduction of Iron Ore Using the Fluidized Solids Technique." As in the petroleum industry, the fluidized solids technique consists of suspending finely divided solids in a moving gas stream. The gas stream not only suspends the solid particles, but actually separates the individual pieces. The authors pointed out that essentially the direct reduction of iron ore is a gas-solid reaction. The effectiveness of direct reduction depends on the extent of gas-solid contact. This investigation was carried on to determine the effectiveness of the fluidized solid approach to the direct reduction of iron oxide bearing materials and study the problems which would be involved in trying to utilize the final reduced product.

The materials studied range in chemical analy-

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BEN FAIRLESS receives the Bessemer medal of the British Iron & Steel Research Assn. from its director, Sir Charles Goodeve, in recognition of his service to the industry. Mr. Fairless' No. 1 business competitor, Eugene Grace, called him, "the industry's leader." The U. S. Steel president accepted the tribute with a "deep sense of his personal unworthiness."

sis from high-grade magnetite concentrates and mill scale, which are nearly pure iron oxide, to extremely lean tailings. Table I lists the analysis of the iron oxide materials used in these tests.

All fluidization reduction tests were carried out as batch operations. The reducing gas used in all experiments was hydrogen. Some supplementary tests were made with mixtures of hydrogen and carbon monoxide and this phase of the program was secondary.

Reduced Iron Oxide v. Scrap

The big problem in direct reduction programs in the last analysis is the proper means for utilizing the reduced or partly reduced product. It was pointed out that as far as the steel industry is concerned, there appear to be only three possible outlets for the reduced product which are: (1) As charge material for the blast furnace, (2) as charge material for the openhearth, and (3) as briquetted in some finished and usable section. Where the reduced product would be used to replace some of the charge oxide, the permissible gangue analysis must be very low.

TABLE II

RESULTS OF FLUIDIZED REDUCTION

Material	Degree of Reduction pct
Magnetite concentrate	64.8
Coarse taconite	91.0
Mill scale	81.8
Blast furnace flue dust	95.3
Hematite iron ore	89.0
Wash ore tailings	87.5

In the authors' opinion, this means that for most reduced iron oxide material, some concentration operation must be carried out following reduction.

The group was told that if the reduced product is used as scrap substitute, the restriction on gangue analysis would even be more severe and the first alternative.

The chief effort in this study using the fluidized solids technique was to produce as completely reduced a product as possible, and thus have a product which would serve as a scrap substitute.

In most of the experiments reported in this paper it was possible to obtain and maintain a fluidized system and to effect some reduction of the iron oxide. However, complete reduction was seldom approached and never attained. The best fluidization reduction performances for the six selected iron oxide materials listed in Table I are shown in Table II.

TABLE I

ANALYSIS OF IRON OXIDE MATERIALS

		Chemical analysis pct					
				Total			
Material	Type of Oxide	Fe_2O_3	Fe_3O_4	Fe	Al_2O_3	SiO_2	C
Magnetite concentrate	Magnetite	.....	98.31	71.14	.....	0.44	.....
Coarse grained taconite	Largely magnetite	13.72	31.23	32.20	1.38	44.66	.....
Mill scale	Magnetic oxide	.....	98.53	70.50	.....	0.51	.....
Mesabi ore	Hydrated hematite	81.36	.....	56.90	.....	8.40	.....
Blast furnace flue dust (dry)	Partly reduced hematite	38.46	38.55	54.80	2.76	10.31	4.72
Blast furnace flue dust (wet)	Partly reduced hematite	69.8	.....	56.3	.....	14.4	5.6
Waste tailings	Hydrated hematite	23.31	.....	16.30	.....	75.00	.....

With each material it was possible to accomplish definite concentration with high iron recoveries. The authors concluded, therefore, that the fluidized solids technique does afford an effective means for roasting iron oxide materials to make them amenable to magnetic separation. They doubt that the fluidization technique and direct reduction could be justified for the production of blast furnace charge material. They do, however, believe that it is conceivable that the reduced product could be utilized either as scrap substitute or as charge oxide in openhearth furnaces.

The other paper presented at the steelmaking technical session was "Significance of Air Temperature in Openhearth Operation," by John S. Marsh, research engineer, Bethlehem Steel Co.

With the increased use of sinter in blast furnace burden, the industry is facing many problems. The sinter technical session was unusually well attended. W. E. Marshall, research metallurgist, Armco Steel Corp., delivered a paper, "The Effect of Sinter on Blast Furnace Production." Mr. Marshall reported on a recent survey of sinter plants which indicated that many companies had difficulty in determining precisely the

effect of sinter on blast furnace operation. He touched on how sinter affects production rates, and the efficiency or yield of sinter charges. He also had some very practical suggestions for blast furnace tests on sinter which would give more information and understanding about any blast furnace burden.

E. G. Hill, director, metallurgy and development, Wheeling Steel Corp., then delivered a joint paper with R. E. Powers, Mellon Institute, on the testing of sinter. A. A. Nilsen, field engineer, American Ore Reclamation Co., reported on "Recent and Prospective Sinter Plant Improvements." Another paper in this session was delivered by R. F. Powers, Fellow, Mellon Institute of Industrial Research, entitled "Improving Current Practice in Blast Furnace Sintering."

During this paper, Mr. Powers pointed out that the capacity of installed sinter plants is now estimated to be in excess of 28 million gross tons per year, whereas 10 years ago it was only 13 million. Mr. Powers also told the meeting that blast furnace practice using sinter has not always shown increased benefits that were expected of it. Many changes have transpired in furnace practice since some of the claims for sinter were first made. The American Iron and Steel Institute, recognizing the growing necessity to improve sinter and sintering, has established a subcommittee on agglomeration of fines to study some of the problems of using sinter. The subcommittee has conducted a survey of current practice as a means of ascertaining facts, and Mr. Powers, in his paper, traced the history of the use of sinter and some of the developments now under way.

Close examination of plants and practices in making blast furnace sinter show that sinter itself can be improved, both in its level of properties and in the uniformity of those properties. Mr. Powers believes that the plant and operating practices must be improved to give closer control, greater efficiency and higher production rates. He offered a few recommendations which may be made for plant design, plant operation, research and development, and blast furnace testing.

Maintenance and Steel Quality Covered

The session on plant operation featured four papers led off by Mr. J. B. Whitlock, general maintenance engineer, Armco Steel Corp., who talked on "Preventive Maintenance Procedure," A. F. Mohri, chief metallurgist, The Steel Company of Canada, Ltd., followed with "Steel Quality as Affected by Track Time and Soaking Pit Practice." Mr. Mohri went into detail on the effect of track time and pit practice on killed 1030 steel and reached the general conclusion that specifying minimum and maximum track times and soaking times will assist in controlling of finished products and keep conditioning of the finished product to a minimum.

WALTER S. TOWER presents the Institute medal to W. G. Nichol, assistant chief industrial engineer, U. S. Steel Corp. W. N. Flanagan, fuel and furnace engineer, U. S. Steel Corp., received a similar award. The regional technical meeting award was won by another U. S. Steel man, H. E. Warren, Jr., assistant general superintendent of the new Fairless Works.

Messrs. C. A. Bishop, A. H. Brisse, R. G. Thompson, C. R. Liebel and W. A. Swaney, of U. S. Steel Co., reported on "Cleaning Ferromanganese Blast Furnace Gas," at this same session. The authors pointed out that the large quantity of dense fumes produced by a ferromanganese furnace are different from those commonly found in gases from other furnaces producing pig iron. The type of gas cleaning equipment needed is, therefore, greatly different than the standard. The authors reported in detail the project which has been undertaken by U. S. Steel Co. to develop a practical method for removing and disposing of the fumes.

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CARBIDE DRILLS increase tool life on cast iron

By E. J. Weller
Schenectady Works Laboratory
General Electric Co.

E. J. Bonesteel
Foundries Division
General Electric Co.

F. W. Lucht
Carboloy Co., Inc., Detroit

Carbide drills have increased tool life on cast iron from 3 to 10 times. Production drills operated successfully from 80 to 200 fpm. At double the speeds used on high-speed drills, carbide-tipped drills produced 3 times the linear inches per grind.

The success of carbide tools in all kinds of applications has frequently led to discussions of the applicability of carbides for the drilling of metals. There have been a number of attempts to drill various materials under different conditions with carbides—with varying degrees of success. However, very little basic data had been evolved with regard to drilling cast iron.

Procedure in the tests was to determine, first, the characteristics of different drill types on a laboratory basis, and then follow this with production testing of a single drill style tipped with different grades of carbide. For the laboratory tests it was decided to secure data on the following factors: Thrust, vibration, torque, horsepower and drill reconditioning required.

The basic test equipment is shown in Fig. 1. The machine is a 3-ft radial drill press with an 11-in. column, equipped with a 5-hp motor. Baldwin-Southwark SR-4 strain gages were attached to the column and to the cross rail to indicate the deflection of the column due to thrust in drilling and to indicate the vibration due to drilling. The dummy gage shown was set

TABLE I

RELATIVE CUTTING VIBRATION

Speed			Thrust				Horsepower Per Cu. In. Per Min.				Relative Vibration		
RPM	FPM	Feed In/Rev.	G-E Type	Union Special Type	Conventional Type	Union Heavy Service Type	G-E Type	Union Special Type	Conventional Type	Union Heavy Service Type	G-E Type	Union Special Type	Conventional Type
192	56.5	0.006	375	425	675	600	0.37	0.38	0.54	0.46	2	3	3.5
		0.008	425	475	775	700	0.37	0.34	0.46	0.42	4	5	3.5
		0.015	650	800	1210	1175	0.34	0.37	0.46	0.48	8	10	5
		0.025	925	1250	1900	1800	0.36	0.42	0.48	0.51	14	11	4
254	75	0.006	375	450	600	550	0.38	0.38	0.45	0.43	2	2.5	3
		0.008	425	475	700	675	0.33	0.40	0.43	0.42	3	5.5	3
		0.015	625	850	1150	1200	0.37	0.44	0.50	0.45	7	8	3.5
		0.025	875	1300	1850	1825	0.37	0.44	0.49	0.52	10	6.5	4
472	139	0.006	350	Unable	425	575	0.48	0.54	0.65	0.61	0.75	0.75	0.75
		0.008	425	to	680	675	0.42	0.43	0.60	0.60	1	1	0.75
		0.015	740	Read	1150	1050	0.44	0.42	0.55	0.54	2	2	1.5
		0.025	925	1100	1750	1650	0.39	0.40	0.49	0.49	3.5	4	1
823	242	0.006	375	350	550	550	0.55	0.57	0.66	0.63	0.5	0.75	0.75
		0.008	425	450	625	600	0.49	0.51	0.59	0.58	0.75	1	0.5
		0.015	600	625	1175	950	0.43	0.45	0.54	0.50	1	2	0.5

Carbide drills (continued)

up with the machine to indicate the effect of temperature on the other SR-4 gages so that this effect could be taken into consideration. The gages on the column were calibrated by placing a force gage on top of a hydraulic jack.

As the jack was lifted, the force gage (being interposed between the jack and the spindle) indicated the magnitude of force causing deflection of the column. This deflection is recorded on the chart of a G-E photoelectric recorder connected to the strain gages.

Recorder indicates vibration

Since it was found difficult to measure the exact magnitude of the horizontal deflection (vibration), the strain gages were not calibrated. Rather, the recordings indicate the relative vibration caused by the various drill designs tried. Thus the units of vibration shown in the tabulation, Table I, are based on arbitrary values, which indicate the relative magnitude of the vibrations.

All of the drills used in the laboratory tests were tipped with Carboloy Co. grade 44A Carboloy cemented carbide and manufactured by the Union Twist Drill Co., Athol, Mass. Three designs of drills were tested: The G-E design, Fig. 2, the Union Special, Fig. 3, and the conventional design.

Drills were reground in a fixture mounted on a cutter grinder, Fig. 4. The arrangement made it possible to use cup-type silicon carbide and diamond wheels already on hand rather than purchasing special wheels for the initial tests.

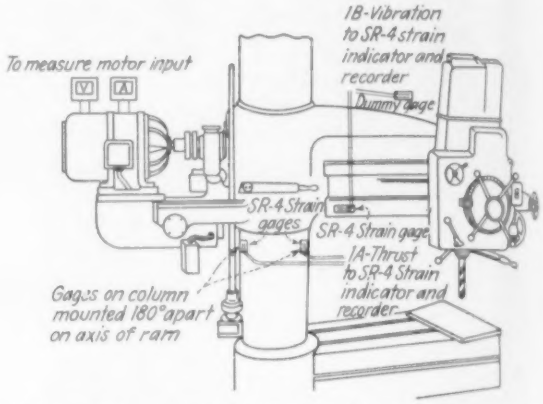
1B-Vibration to SR-4 strain indicator and recorder
To measure motor input
V
A
Dummy gage
SR-4 Strain gages
SR-4 Strain gage
1A-Thrust to SR-4 Strain indicator and recorder
Gages on column mounted 180° apart on axis of ram

FIG. 1—Sketch of radial drill press showing strain gage locations for recording thrust and vibration.

In making this setup, the only thing necessary was to provide the dividing head with a bushing to fit the drills. The head was then set at the proper relief angle and swung to provide the setting for the desired included angle of the drill point. An aluminum oxide wheel was used to grind the steel backing for clearance behind the carbide tip. The carbide tips were then rough ground with a silicon carbide wheel and finish ground with a diamond wheel. The accurate and uniform point grind on the drills obtained in this manner led to the same setup being used for

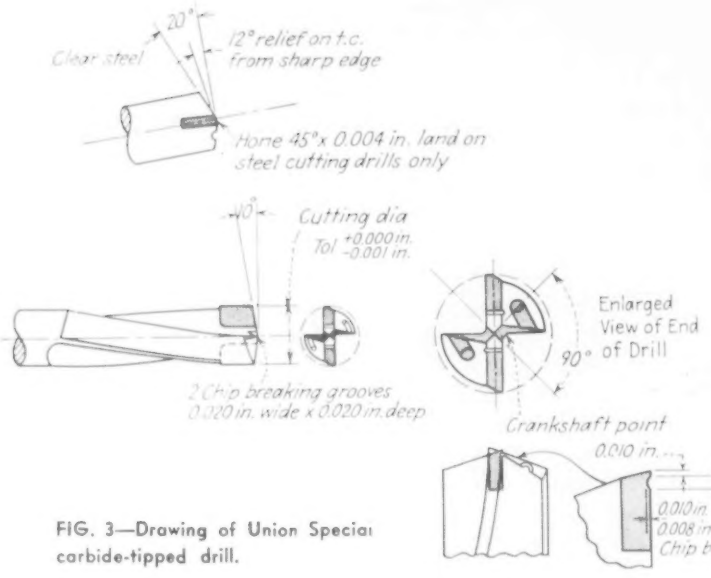

FIG. 3—Drawing of Union Special carbide-tipped drill.

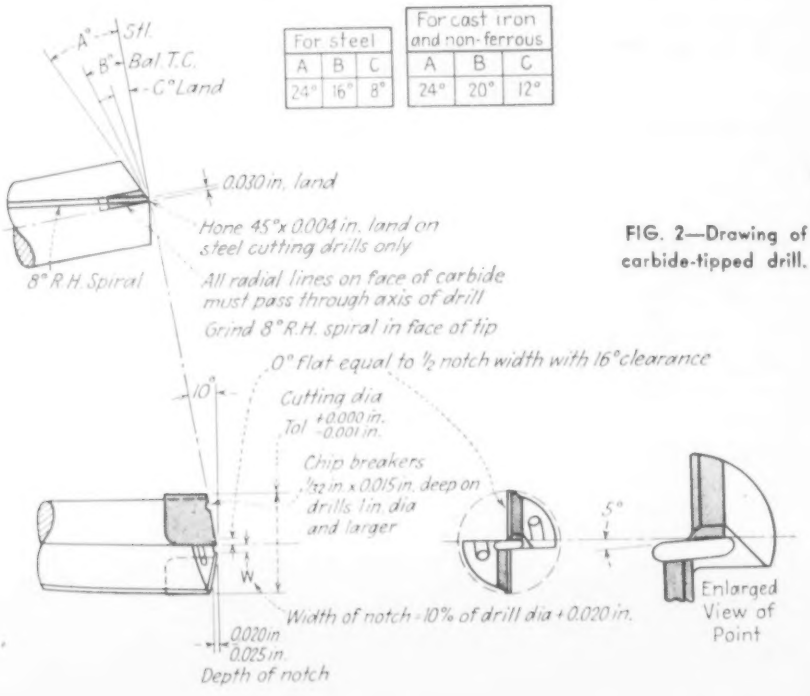
A°-Stl.
B°-Bal. T.C.
C°-Land
For steel
A 24° B 16° C 8°
For cast iron and non-ferrous
A 24° B 20° C 12°
0.030 in. land
Hone 45° x 0.004 in. land on steel cutting drills only
8° R.H. Spiral
All radial lines on face of carbide must pass through axis of drill
Grind 8° R.H. spiral in face of tip
0° Flat equal to ½ notch width with 16° clearance
10°
Cutting dia
Tol +0.000 in. -0.001 in.
Chip breakers 3/32 in. x 0.015 in. deep on drills 1 in. dia and larger
W
Width of notch = 10% of drill dia + 0.020 in.
0.020 in.
0.025 in.
Depth of notch
5°
Enlarged View of Point

FIG. 2—Drawing of G-E carbide-tipped drill.

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grinding the drills used in the production tests.

The cast iron test material had a hardness of approximately 168 Bhn and a machinability rating of 128 pct. This machinability rating was determined by the ratio of time required for a standard drill, ground to standard angles and used on a drill press to penetrate into (a) the cast iron used for the test and (b) into free machining, cold-drawn AISI B1112 steel under identical speed and thrust load.

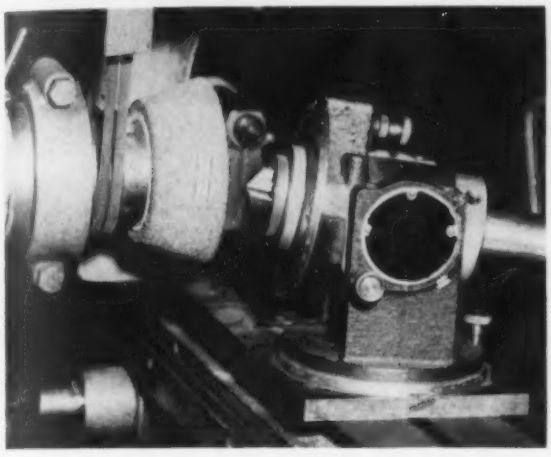

FIG. 4—Fixture used for regrinding drills.

All drilling was done dry without pilot hole or bushing; all holes were drilled through, and all holes in a test series were drilled in the same test block. Test blocks were 12x18x1 in. thick, 1/16 in. having been machined off top and bottom of each plate prior to starting the tests.

All drills were tested for quality of braze by measuring the relative electrical resistance through the brazed joint. They were also Zyglo and Magnaflux inspected for cracks, and checked dimensionally.

Hp of machine was exceeded

Drilling speeds in the tests were 192 rpm (56.5 fpm), 254 rpm (75 fpm), 472 rpm (139 fpm) and 823 rpm (242 fpm). The feeds used were 0.006 in., 0.008 in., 0.015 in. and 0.025 in. per rev. At each of these speeds, each of the various feeds were tried except for the combination of 823 rpm and 0.025 in. feed. This combination of speed and feed exceeded the horsepower capacity of the equipment by an excessive amount.

Determination of torque and horsepower were made by connecting an ammeter and a voltmeter to the power input side of the drill press drive motor. By the use of motor characteristic curves furnished by General Electric Industrial Div., Schenectady, it was then possible to determine the motor output in hp and torque. Machine losses due to gearing and bearings were neglected. Input power was read at no load and when drilling no-load power was read with spindle revolving and feed engaged. Thus all hp input was considered as consumed in drilling.

Table I lists the results of the laboratory test

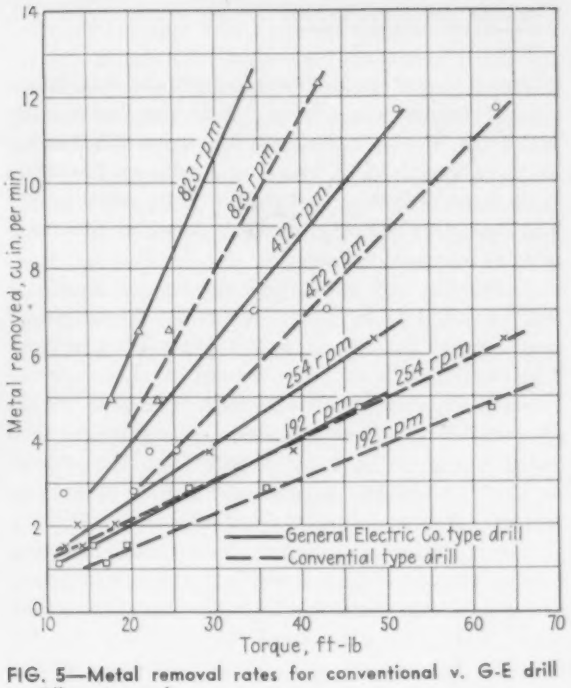

FIG. 5—Metal removal rates for conventional v. G-E drill at different speeds.

runs. Examination of the data shows that for the conventional drill operation at 472 rpm and 0.025 in. feed per rev results in relatively little vibration and low power requirements per unit

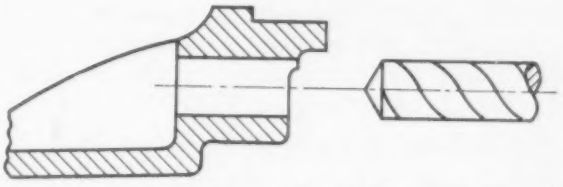

FIG. 6—Cross-section through hole drilled in cast iron end shield.

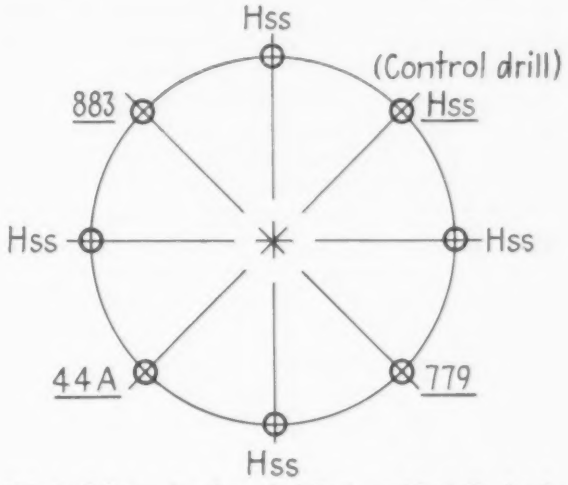

FIG. 7—Relative location of drills in multi-spindle head.

of the metal removed. Under these operating conditions we should therefore expect to obtain good drill life, smooth operation and satisfactory output rates when applied on a production basis.

The G-E type drill, Fig. 2, also required a mini-

mum of power under these conditions but excessive vibration was set up. For the Union Special drills, Fig. 3, essentially the same conclusions as those for the G-E type can be drawn from the tests, except for the fact that slightly more power and thrust is required in most cases to remove a similar amount of material.

Under the test conditions the special types, it will be noted from Table I and Fig. 5, consumed less hp per cu in. of metal removed per min. The modification of point design on these special types overcame the effect on torque and thrust of variations in web thickness, spiral angle, and point angle to such an extent that the special types required less torque and thrust to remove a unit volume of material in all cases.

The decrease in hp per cu in. per min amounted to approximately 20 pct while the thrust required decreased approximately 35 pct. Heavy duty and long drills, 13⅝ in. as against the 10⅛ in. for the standard, were also tested. These yielded results similar to those tabulated in Table I.

Both the special drills required less thrust than the conventional type drill. This is particularly noticeable at heavy rates of feed. In general four factors have considerable influence on thrust: Web thickness, spiral angle, relief, and point angles. Increasing the web thickness and included-angle of the point increases the thrust required for drilling, while increasing the spiral-angle and lip relief-angle decreased the thrust required.

Special point grind pays off

The tests indicated that the special point grind caused the normally expected changes of forces to be cancelled out when the special drills are compared to a conventionally pointed drill. Such grinds should permit using drills having heavier webs, more blunt included angles, and decreased lip relief. These changes, furthermore, should result in a stronger and more wear resistant drill, without increasing thrust loads.

The special types showed steadier characteristics at light feeds, 0.006 in., but as the feed was increased to above 0.008 in. the conventional drill was the steadiest. The tendency toward vibration of the special point grind was apparent at all speeds.

With regard to torque required to remove a unit volume of material, the G-E design proved slightly more efficient in nearly all cases, as shown in Table II. With regard to effect of metal removal rate, test data indicate greater torque and thrust will be required to remove material as volume per minute increases. The efficiency, measured in amount of material removed per unit of power, is lower, however.

In connection with the advantages of the special drills noted, it should be pointed out that these are not so great as to rule out the conventional drill. As a matter of fact, if production rates are low, cost of the specials may not be justified, particularly if the equipment is of relatively low-speed type. The conventional drill, it will be noted, performed particularly well at the lower speeds with heavy feeds.

TABLE II

DRILL PERFORMANCE

Type of drill	Range of hp/in³/min
G-E type	0.33 to 0.55
Union Special	0.34 to 0.57
Conventional heavy service	0.42 to 0.63
Conventional	0.43 to 0.66

TABLE III

PRODUCTION DRILL SPECIFICATIONS

Diam	9/16 in.	Drill tip symbol	Carboloy Co. Tip TD14
Size shank	No. 2 Morse type		
Length overall	8⅞ in.	Helix angle of body	15° RH
Length body	5⅛ in.	Helix angle at lip	7° RH
Length neck	⅝ in.	Point angle	118°
Length shank	3⅛ in.	Lip relief angle	12°
Web thickness	1/16 in.	Drill body	Hardened HSS

In the light of the satisfactory results obtained with the carbide drills in the laboratory tests, it was decided to extend the tests by applying such drills to two different types of production runs and using these to compare various grades of carbide under as near identical conditions as possible. Conventional type drills were selected for these tests, Table III.

Carboloy cemented carbide grades 779, 44A and 883 were tested in production runs, drilling induction motor and shields. The selection of the three carbide grades was on the basis of the variation in hardness which they provided (Grade 779 is approximately 89, Grade 44A approximately 91, and 883 approximately 92, all Rockwell A).

TABLE IV

DRILLING SPEEDS USED

RPM	SFPM
643	137
720	153
795	169
870	185
945	201

The machine was an old W. F. & Jones Barnes vertical drill press, with 8-spindle head, designed for HSS drilling. Feed and speed are fixed on the machine, 517 rpm or 76 sfpm and 5 ipm or 0.010 in. per rev, so that performance of the carbide drills was under the same feed and speed conditions as for the regular high-speed steel drills.

Fig. 6 shows a cross-section through one of the holes drilled. It should be noted that the drill starts partly on a shoulder which has been machined and breaks through a scaly surface. Little if any chipping out of the casting occurs

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TABLE V

RADIAL DRILL SPECIFICATIONS

Drill type	Conventional	Web thickness	3/32 in.
Diam.	13/16 in.	Drill tip symbol	TD18
Size shank	No. 3 Morse	Helix angle of body	15° RH
Length overall	9 15/16 in.	Helix angle of lip	7°
Length body	6 1/2 in.	Point angle	118°
Length neck	9/16 in.	Lip relief angle	12°
Length shank	3 7/8 in.		

at the breakthrough. The drills pass through bushings in the fixture before entering the work, but these bushings are so badly worn it is doubtful if the drills make contact with them while drilling. The work is held in a roll-over type fixture permanently attached to the machine.

The production run included two types of end shields, one with four 9/16-in. diam holes located 90° apart and another with eight 9/16-in. diam holes located 45° apart. Fig. 7 shows the relative location of the various grades of carbide-tipped drills and the HSS control drill during the production test run.

Specified maximum hardness of the cast iron end shields was 210 Bhn. Hardness tests at different locations on several of the castings showed an average indicated hardness of 176 Bhn. Machinability as determined by the drill press test mentioned previously was approximately 125 pct.

No breakout at edge of holes

The drills operated normally without any objectionable breakout around the edge of the holes. Chips showed a tendency to curl. Occasionally buildup would form along the cutting face of the drill lips or on the drill margin. This buildup would come and go.

At 200 holes, 225 linear in., the high-speed steel drill had to be removed and a freshly sharpened drill substituted. All carbide-tipped drills were in good condition with the exception of grade 883 which had a minute chipout on one of the lips about midway between the outside diameter and the center. The grade 883 tipped drill was left in its spindle, however, since the chip-out did not seem to be causing trouble.

The high-speed steel drill continued to have to be resharpened after an average of every 200 holes throughout the run. In contrast, each of the carbide-tipped drills has drilled approximately 2000 holes to date without regrinding. The minute chip-out of the grade 883 drill disappeared having been lapped out by the action of the chips. Fig. 8 shows the appearance of some of the drills after use. As may be noted, the grade 779 drill does show some wear at the corners but nowhere near as much as on the HSS drill. Thus each of the carbide-tipped drills had produced approximately 10 times the number of holes per grind as the HSS and were still capable of further drilling before sharpening.

The second comparative grade and performance test was conducted on a radial drill press with a 5-ft arm and 17-in. column. The machine had the usual range of spindle speed. Speeds at which tests were run are listed in Table IV. Feeds used in the tests included 0.010, 0.012, 0.014 and 0.015 in. per rev of drill.

Scale removed in test runs

The drills used were tipped respectively with grades 44A, 883 and 779. All drills had the general specifications shown in Table V. The part used for the tests was on water boxes and covers. Both sides of the water boxes are milled prior to drilling so that the drills do not contact scale and even the HSS drills should be expected to give long life. When drilling the covers the drills enter the matching surface which is milled prior to the drilling operation. This means the drills break through a scaly surface and are thus inclined to dull more rapidly. Hardness readings were taken on several of the water boxes with a portable hardness tester. Readings varied between 123 and 183 with an average of 160 Bhn.

All parts were clamped to the drill press table. The holes were spot drilled with a high-speed steel drill using a bushed template for locating the holes. The HSS drills previously used were all mounted in a quick change holder to facilitate handling. This practice was not changed for the carbide drills. All drilling was done dry and only machine feeds were used.

A comparison of the 12.32 ipm feed rate for the grade 44A drill with a 4.32 ipm feed rate for a high-speed steel drill shows that the carbide drill permitted the drilling of holes 2.9 times faster than in the past.

Drills tipped with grade 883 and 779 operated at about twice the production rate as had been used for high-speed steel drills in the past. Grade 779 showed some tendency to buildup along the drill margins. Grade 883 also showed some buildup along the drill margins but to the least extent of the two grades used. Grade 883 seemed to cut freer than grade 779. Both grade 883 and 779 drills permitted drilling 4 3/4-in. deep holes without any sign of breakdown due to heat at the braze line. The cast iron chips showed a tendency to coil out of the shallow holes.

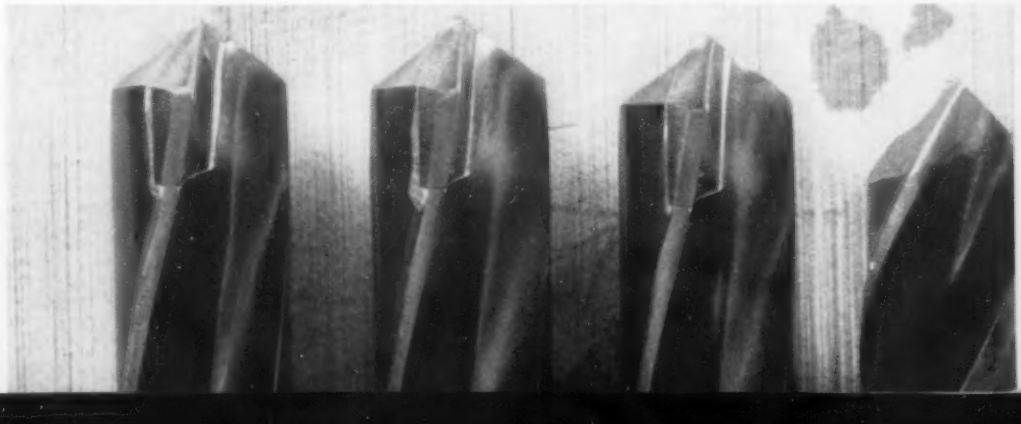
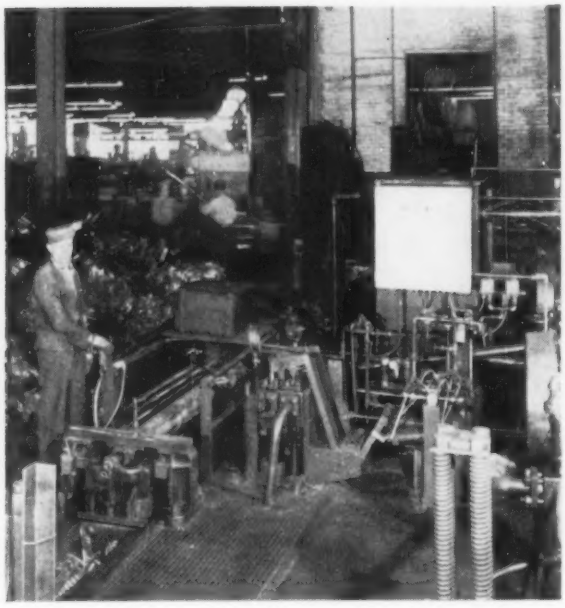


FIG. 8—Appearance of drills used on end shield after drilling 1500 holes. Drill grades from left to right are: 779, 44-A, 883 and HSS.

One man does work of two at scrap baler



By replacing manually operated levers with electrically controlled compressed air cylinders, The Riverside Metal Co., Riverside, N. J., now operates its "cabbage" machines with one man instead of the two formerly required. The changeover will pay for itself in less than 10 months.

Formerly, to operate the hydraulic rams which compress scrap metal into easily handled bales, the dotted-in levers had to be manipulated manually. This required one man at the loading zone and a second at the levers.

Replacement of the three levers with remote-controlled cylinders (arrow) permits one man, from one side of the machine, to load, operate and unload the baler. The result is more than twice as many bales per manhour, plus liberation of manhours for use elsewhere in the plant. Current defense activities of the copper alloys producer make this additional manpower sorely needed.

Static friction tested with special lubrications

Static friction tests of a number of relatively new special lubricants, in combination with various metals, have recently been completed at the National Bureau of Standards.[1] The investigations were sponsored by the Naval Ordnance Laboratory and conducted by H. S. White of the NBS engines and lubrication section. Although lubricant information was the primary concern of the tests, the effect of metal composition and of metal surface finish on static friction was also investigated.

Static friction coefficients are indices of the ease with which one of a pair of metal surfaces (lubricated, in the present case) will start to slide in relation to the opposing surface. While low static friction is desirable in many applications, it cannot be taken as an indication of overall lubricant merit.

Some 20 special lubricants, principally chlorinated and fluorinated hydrocarbons with and without various additives, were tested. Additives investigated included graphite, molybdenum disulfide, zinc oxide, boron nitride, and an oxidized petroleum compound. An SAE 10 mineral lubricating oil (Navy symbol 2110) was used as a reference or basis of comparison. Metal surfaces used in various combinations for the tests were stainless steel, carbon steel, cast iron, aluminum alloy, and chromium plate. An inclined plane test apparatus of conventional design was used.

Lowest static friction was shown, in general, by test lubricants containing molybdenum disulfide—closely followed by a mineral lubricating grease, dry molybdenum disulfide and a fluorinated hydrocarbon with graphite additive. Lubricants for which the most favorable data were obtained showed static friction about 50 to 60 pct less than the SAE 10 reference oil.

A lubricant containing an oxidized petroleum compound, and one containing a silicone grease, gave slightly less friction than the SAE 10 oil. Higher friction than the reference oil was shown by the chlorinated and fluorinated lubricants without additives, and by the remaining special lubricants.

Certain heat-treated stainless steel combinations showed, with most lubricants, the lowest friction values. With a few lubricants, a chromium-plated rider on a heat-treated stainless steel plate gave low friction values comparable to those for the stainless steel combinations.

Dependence of relative friction rank on the lubricant used was especially great in the case of an Alcoa 214 plate used with either a chromium-plated rider or a stainless steel rider, and also for the combination of a 1050 steel rider and a cast iron plate; each of these combinations ranked high in friction when used with one or more lubricants, but low when tested with other lubricants.

[1] For further technical details, see **Static friction tests with various metal combinations and special lubricants**, Hobart S. White and Dino Zei, J. Research NBS 46, 1941, p. 292 (RP2198).

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Versatile MACHINES USE *Versatile* VICKERS Hydraulics

Mixermobile Duo-Way Scoop with dozer at one end and one cubic yard bucket at other.

Vickers Hydraulics are versatile . . . they provide any motion or combination of motions, any amount of power at any distance. Control is fast, smooth, accurate and reliable. The heaviest mobile equipment can be put through the most precise operations with no more physical effort than it takes to flip a lever.

Hence, in designing versatile machines, manufacturers make large use of Vickers Hydraulics. These Mixermobile Units are representative . . . they are 100% Vickers equipped, offering the advantages of undivided responsibility and a nationwide organization. For information about the many ways that Vickers Hydraulic Pumps and Controls improve performance and cut costs on mobile type machinery, write for new Catalog M-5100 or get in touch with a Vickers application engineer.

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Application Engineering Offices: **ATLANTA • CHICAGO (Metropolitan) • CINCINNATI • CLEVELAND DETROIT • HOUSTON • LOS ANGELES (Metropolitan) • NEW YORK (Metropolitan) • PHILADELPHIA PITTSBURGH • ROCHESTER • ROCKFORD • ST. LOUIS • SEATTLE • TULSA WASHINGTON • WORCESTER**

Engineers and Builders of Oil Hydraulic Equipment Since 1921

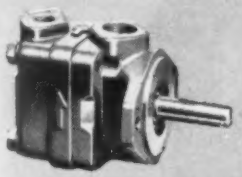
4498

More COST-CUTTING Applications of VICKERS HYDRAULICS

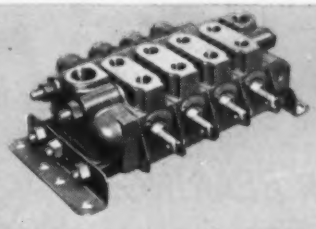
Mixermobile complete mobile concrete mixing and elevating plant.

MIXERMOBILE
MIXERMOBILE MANUFACTURER

Wagnermobile Model "C" Scoop, one machine for six jobs.



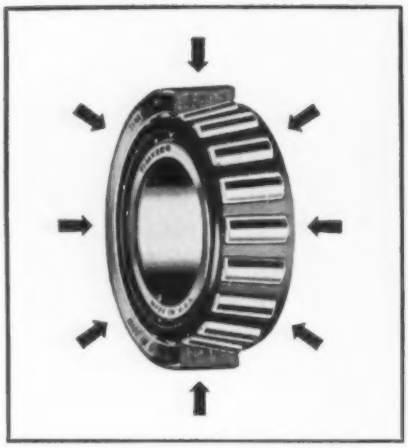
Vickers Balanced Vane Pumps feature automatically controlled radial and axial clearances that maintain high efficiency throughout long life.



Vickers Multiple Unit Valves consist of individual operating valve sections, assembled in almost any combination for various hydraulic control functions. Provide precise positioning under actual operating conditions . . . unaffected by surges.

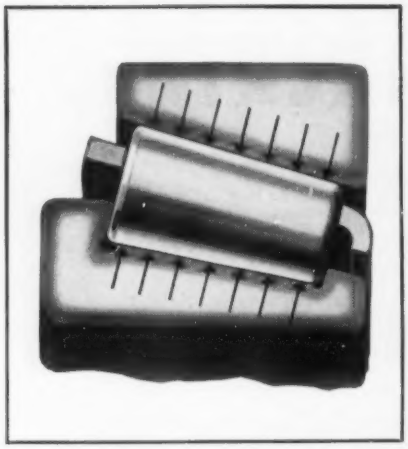
ASK FOR CATALOG M-5100
Vickers Hydraulics for Mobile Equipment

Vickers Steering Booster provides instantaneous, effortless hydraulic power for maximum maneuverability with heaviest loads on steering axle.



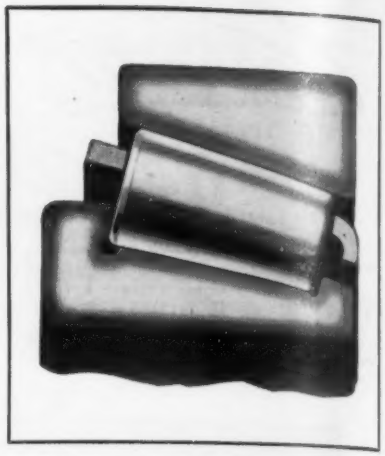
TAPERED CONSTRUCTION

Because Timken® roller bearings are tapered in design, they carry *both* radial and thrust loads. Shafts are held in alignment, auxiliary thrust bearings eliminated, easy adjustment permitted.



LINE CONTACT

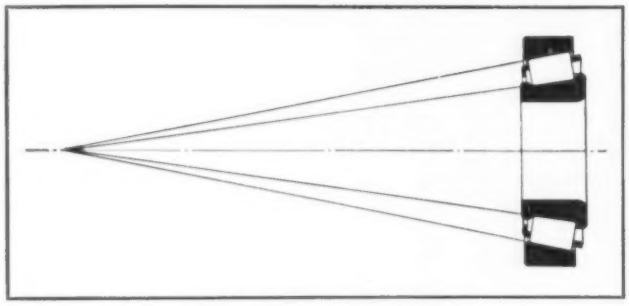
In Timken bearings, the load on the rollers and races is spread evenly over a *line* of contact. Because the load area is greater, Timken bearings offer extra load-carrying capacity.



HARD SURFACE, TOUGH CORE

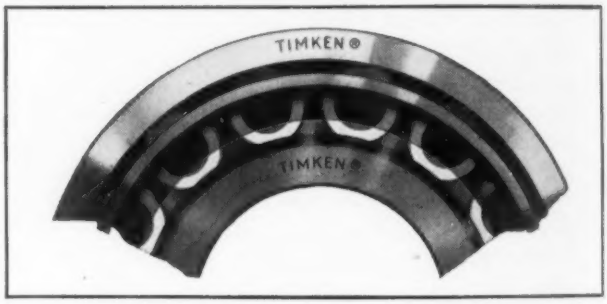
Made of Timken fine alloy steel, rollers and races of Timken tapered roller bearings are case-carburized, resulting in a hard, wear-resistant surface and a tough, shock-resistant core.

To get all this, get TIMKEN® bearings!



TRUE ROLLING MOTION

Since rollers and races of Timken bearings are tapered so that all lines coincident with their tapered surfaces always meet at a common point on the axis of the bearing, the rollers roll smoothly, frictionlessly. Wear is minimized, precision lasts longer. It's another big advantage you get in Timken bearings.



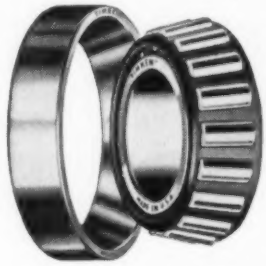
POSITIVE ROLLER ALIGNMENT

Wide area contact between roller ends and rib of the cone insures positive alignment of the rollers in Timken bearings—more precision, less friction, longer wear. Be sure the bearings you buy carry the trademark "Timken". The Timken Roller Bearing Company, Canton 6, Ohio. Cable address: "TIMROSCO".

TIMKEN

TRADE-MARK REG. U.S. PAT. OFF.

TAPERED ROLLER BEARINGS



NOT JUST A BALL ○ NOT JUST A ROLLER ▭ THE TIMKEN TAPERED ROLLER ▭ BEARING TAKES RADIAL ▯ AND THRUST —▯— LOADS OR ANY COMBINATION

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news of industry

Need 6 Million More Defense Workers by '52

Can get 3 million from present hard goods lines . . . Class 58 labor markets as tight—12 are critical . . . More than 50 occupations on critical list . . . Manpower controls fought.

New York — Industry's labor supply headache is big and will get bigger. Labor Dept. forecasts estimate 6 million more workers will be needed in defense and defense-supporting industries by the end of 1952. Industry will have to "find" 3 million of these among persons not now employed.

Defense spending is expected to reach an annual rate of $50 billion in December. Trailing this outpouring are shortages of plant capacity, materials, power, transportation and labor.

The tight labor situation in engineering and skilled technical groups highlights a growing all-around labor shortage.

Only six metropolitan areas showed a tight labor supply early in 1950. By April 1951, 58 major labor markets were tight, and a dozen were reaching the shortage category. Labor Dept. experts foresee more and more critical shortage areas.

More Difficult Now

Solution of today's labor problem may be more difficult than in 1940. Then we had 8 million unemployed representing 14.6 pct of the labor supply. By 1944 industry expanded payrolls by 6.5 million.

Today we have roughly 60 million employed and unemployment of 1.7 million. Peak needs are coming at a time of high civilian employment. Unemployment for the last 3 months of 1950 averaged only 3 pct of the labor force.

Some 3 million of the additional 6 million the Labor Dept. estimates will be needed and will come from production lines of consumer durables. Some employees will simply switch over in the same plant.

Present unemployment is 1.7 million. But many of these are unemployable and industry can look for a slim ½ million here at best. Another 1 million new, young workers are expected to enter the labor pool. The balance of close to 3 million, and possibly more, will have to be found among women, older, handicapped and minority group workers.

Shortage of Skilled Workers

Some migration of workers from less busy areas to those where defense workers are badly needed is expected.

Biggest headache is the shortage of skilled workers. More than 50 occupations are on the critical list. All need 2 years' training as a minimum. Some, as tool and diemakers and engineers, require 4 years or more. The need for sound apprentice training programs is gaining wider recognition.

Shortage of technical skills has not been helped by the Services' scramble for men. Many engineers and scientists are eligible or are reservists. An uncritical call-up policy for reservists has hurt large companies.

The shortage of engineers is

Turn Page

Negotiate Merger

Pittsburgh — Pittsburgh Steel Co. and Thomas Steel Co. are negotiating a proposal that Pittsburgh Steel take over Thomas in exchange for shares of prior preferred stock and common stock of Pittsburgh.

A joint announcement by Avery C. Adams, president of Pittsburgh, and E. M. Barber, president of Thomas, explained outstanding preferred stock of Thomas will be called for redemption, but preferred stockholders may be given an opportunity to exchange their stock for common and prior preferred of Pittsburgh on a suitable ratio.

Results of the negotiations will be subject to stockholder approval and favorable rulings on tax matters.

Packard Electric Expanding

Warren, Ohio—Two new buildings will be added here by Packard Electric Div. of General Motors Corp. The new buildings, one 40,000 sq ft and the other 108,000 sq ft, will enable Packard to fulfill defense contracts and continue civilian production.

The smaller building will be an addition to Plant 8 and will house an expanded wire mill. Both plants 8 and 7 were acquired from Federal Machine & Welder Co.

Navy Asks Bids on Airstrips

Washington—Navy Dept. will shortly ask bids on several projects totaling $192 million for construction and renovation of airstrips.

INDUSTRIAL SHORTS

Warsaw Organized—The formation of a new corporation to be known as WARSAW PRODUCTS, INC, Warsaw, N. Y., to succeed the Warsaw Button Co. has been announced. Future plans for expansion of activities will include product and market development in the electronics industry. The Wood Products Div. will continue the firm's former line.

Merger Proposed — Officials of WESTINGHOUSE AIR BRAKE CO., UNION SWITCH & SIGNAL CO., have called a special stockholder's meeting to consider merger of the 2 companies and WESTINGHOUSE PACIFIC COAST BRAKE CO.

ICC Congress — "Economic Development in a Period of Rearmament" will be the general theme of the 13th Congress of the International Chamber of Commerce to convene in Lisbon, June 11-16. About 800 leading businessmen and economists will meet there during that June week.

Takes Option—The GENERAL ELECTRIC CO. has taken an option to lease manufacturing space in Ludlow, Vt., as part of its currently expanded jet-engine production program.

Regal Adoption — REGAL WARE, INC., Kewaskum, Wis., is the new name of the Kewaskum Utensil Co. Except for the name, no other change has been made in the organization or its personnel.

Aleman Attends Opening—President Aleman of Mexico, accompanied by several of his ministers and other government dignitaries, attended the opening of a new vertical turbine pump plant of WORTHINGTON PUMP & MACHINERY CORP., in Mexico City.

Warehouse Opened—STEUBER STEEL CO. opened a new warehouse in Ambler, Pa., a suburb of Philadelphia.

Engineering Project — Rheem Mfg. Co. has awarded WIGTON-ABBOTT CORP., engineers and contractors of Plainfield, N. J., the contract for the design and construction of a new $1,500,000 steel shipping container plant in Linden, N. J.

Appoints Distributors—The Industrial Chrome Div., WARD LEONARD ELECTRIC CO., Mt. Vernon, N. Y., appointed the following companies as distributors of Chromaster and Chromasol: S. B. Roby Co., Rochester, N. Y.; Syracuse Supply Co., Syracuse, N. Y.; Logan Hardware & Supply Co., Huntington, W. Va.

Increases Facilities — The demand for Marcus Transformers and the need for increased production facilities prompted the MARCUS TRANSFORMER CO., INC., Hillside, N. J., to add an annex to their present plant.

J&L To Get Reheat Furnace—The two-zone reheating furnace for the JONES & LAUGHLIN STEEL CORP.'s new bar mill at the South Side Works in Pittsburgh will be built by Salem Engineering Div. of Salem-Brosius, Inc.

Added Assets — SPECO, INC., Cleveland, recently purchased all of the assets of the Silicone Products Co. of America. All of the product lines formerly produced by Silicone will be manufactured by Speco at its plant in Cleveland.

Queens Pipe Line—The Walsh Holyoke Div. of CONTINENTAL COPPER & STEEL INDUSTRIES, INC., has started fabrication of a new water pipeline for the A. J. Orlando Contracting Co. of Whitestone, N. Y.

Going Up—Ground was broken for an industrial building which will adjoin ALL-STATE'S home office and plant in White Plains, N. Y. This addition will more than double their factory area.

acute. Some concerns report they can fill only 36 pct of vacancies with college recruiting. Other shortages include patternmakers, auto mechanics, toolmakers, machinists, sheet-metal workers, electricians and aircraft assembly workers and clerical help.

Hardest hit areas in the labor scramble are Detroit, Kansas City, St. Louis, and cities in northern Ohio, and Los Angeles.

Manpower controls are divided among Selective Service, Office of Defense Manpower of the Dept. of Labor, Office of Manpower Requirements of the Defense Production Administration, U. S. Office of Education (for training programs and vocational schools), and the Office of Defense Transportation which recruits railroad workers.

Powers are lacking for a draft labor edict and an overall manpower agency such as the World War II War Manpower Commission is being fought from several angles.

Defense Mobilization officials do not believe we need a labor draft law to deal with the emergency. The Labor Dept., Selective Service and several industry groups object to compulsory labor legislation.

U.S. Steel's Expansion For Defense in Full Swing at Plants

New York—Less than a year old, U. S. Steel's national defense expansion program is in full swing at its subsidiary plants, reports the Fiftieth Anniversary Issue of the *U. S. Steel Quarterly*.

As scheduled, erection of steel for the Fairless Works' cold-rolled sheet and tinplate mill began on May 1. Nearly completed, programs in the Pittsburgh and Chicago districts will add 1,660,000 tons to steelmaking capacity.

Gary Sheet & Tin Mill has completed 200,000 tons of cold-rolled steel capacity and another 120,000 tons of tinplate capacity is 95 pct complete. Other increases are: Homestead Works, 375,640 tons of slabbing capacity, completed; South Chicago Works, 108,000

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tons of wide flange beam capacity, 50 pct complete, and 151,500 slab tonnage, 75 pct complete.

National Tube's expansion is almost complete, except for its new Fairless Works. Its Gary, Ind., new extrusion plant is 10 pct complete. At National Works, McKeesport, Pa., a sintering plant and a new mill for large-diameter electric weld pipe have been completed. The Gary, Ind., works has three small-diameter electric weld mills and a new stainless tubing department. Its seamless mill was improved.

Tennessee Coal & Iron has its project to expand ingot capacity by 500,000 tons underway. The Pittsburgh, Calif., sheet and tin mill has its 291,000 tons capacity addition about 12 pct complete. Geneva Steel Co. is building another 160,000 tons of steel capacity and 234,750 tons of sheet capacity.

NPA Binds Stainless With Tighter Controls

June melt schedules on alloy and stainless steel cancelled . . . Schedules showed increased use of alloys . . . NPA also sharply steps up stainless set-asides in third quarter.

Washington—The control noose is being drawn tighter around stainless and alloy steel products. In two separate actions last week National Production Authority moved to: (1) Squeeze defense requirements for alloy and stainless steels containing strategic alloying elements and (2) order greatly increased set-asides of stainless steel products for third quarter defense and defense-supporting needs.

Extreme scarcity of nickel, molybdenum, cobalt, and columbium caused NPA to suspend all alloy and stainless steel producers' melt schedules for June production of DO and directed orders. NPA told stainless and alloy steel producers that further instructions on June schedules will be forthcoming soon.

June Directives Coming

The melt schedule moratorium was ordered because schedules submitted in May showed substantial increases in usage of the four strategic alloys, all of which are in extremely short supply. NPA indicated new directives for June production may be issued early this week.

NPA had previously directed International Nickel Co. to honor only 60 pct of DO orders for nickel during May. As a result steel producers had been melting DO orders on a first-in, first-out basis, excepting special directives.

For use on non-rated orders, NPA is directing the nickel producer to supply steel mills with 15 pct of the base period receipts. In the case of molybdenum the figure is 25 pct. Both percentages may be readjusted later.

Pending formal approval of June melt schedules, alloy and stainless producers are authorized to melt all orders, rated and non-rated, which contain silicon, manganese, chrome and vanadium—alone or in combination.

In a separate action NPA was readying a revision of M-1 which will provide sharply stepped-up set-asides for stainless steel products for zooming third quarter mobilization needs. Lead times will not be changed.

Pending actual issuance of the amendment, steel mills have been notified of the proposed action. The order would place some stainless steel products under complete control. Percentage set-asides of many other products are doubled or tripled.

Following are the products to be affected, together with old and new set-aside percentages:

PRODUCT	OLD AND NEW PERCENTAGES
Ingots	From 25 to 75
Blooms, slabs, billets, except shell quality	25 to 75
Sheet rounds	50 to 75
Structural shapes, heavy and wide flange, plates, strip mill and universal mill	50 to 100
Bars, hot-rolled and other, and bars, cold-finished	50 to 75
Standard pipe	25 to 100
Seamless and welded mechanical tubing, seamless and welded pressure tubing	50 to 100
Low and high carbon drawn wire	50 to 90
Hot and cold-rolled sheets	40 to 75
Hot and cold-rolled strip	25 to 50
Castings and forgings, wire rope and strand	25 to 75
Welded wire mesh	15 to 75
Netting	15 to 75

In addition, NPA issued instructions to increase reserves of hot-rolled carbon bars from the present 45 pct up to 55 pct to include projectile and shell quality bars under 3 in. Projectile and shell quality bars in sizes of 3 in. and larger will be taken care of in the future by directives.

EXTRA ACCURATE: Technician observes the reference circle through locating microscope of the two dividing engines recently installed at W. & L. E. Gurley, Troy, N. Y., 106-year-old firm making engineering and surveying instruments. Diamond-pointed tool in machine's center makes actual marking of circles to an accuracy of less than 1 second. The machines were built by the Societe Genevoise d'Instruments de Physique, Geneva, Switzerland.

BITS AND BRIEFS

By Bill Packard

Long experience in a sellers' market has really left its mark. Some people who should know better think we have overproduction when consumers can choose brand, model and color for immediate delivery . . . **Prediction: Current softness in some consumer goods lines will disappear by the fourth quarter. Even inventive auto makers beginning to bow to government restrictions on use of metals** . . . Defense spending will spurt faster again after more money is voted in a couple of months. Later, this spending will be reflected in personal incomes which are already running 10 pct above a year ago . . . Stainless steel display panels being exhibited at 14 schools of architecture in East and Midwest. Displays feature stainless as a building material . . . **Effort being made to reopen Lustron to turn out military housing and barracks. But, under an order from the President, the Navy has requisitioned the plant and is stripping it to use empty floor space for airplane assembly** . . . Thompson Bros., Inc. (Cleveland), to make jet engine parts in government-owned plant which was operated by Harrisburg Steel during last war . . . Westinghouse Electric Corp. has installed sunlamps over work areas in their Chicago district office. Employees now get tan while they work, and will have fewer colds, the company hopes . . . J. C. Goolsby appointed executive secretary of Copper and Brass Warehouse Assn. Temporary offices are at Bethesda, Md., pending permanent location in Washington . . . **Cost of living index almost stable during past month. But rise since January will give auto workers 3-cent boost. Four-cent "improvement" boost due in June will make total increase 7 cents an hr** . . . Labor Dept. issuing new booklet which graphically shows communism means loss of freedom for workers. First copies were distributed at AFL Union Industries Show in Chicago last week . . . A $3 million plus contract for the John A. F. Hall Housing Project in Harrisburg has been let to Ritter Bros. . . . Handy wallet-size cards clarifying daylight vs. standard time in all major cities are again being passed out by Bob Kane, of F. H. McGraw & Co., 51 E. 42nd St., NYC. Last year he answered 20,000 requests from confused (?) travelers.

Blasts "Discrimination" Against Auto Makers

Ford's E. R. Breech cites percentages to show competition makes more automatic transmissions . . . Warns that discrimination against auto industry can spread—*By Walter Patton*

Cincinnati—Arbitrary discrimination against the automobile industry may be the forerunner of similar action by government against other industries that could jeopardize the entire U. S. economy, E. R. Breech, executive vice-president, Ford Motor Co., told 500 suppliers assembled here at the formal opening of the automatic transmission plant supplying Ford and Mercury cars.

Breech said that government controls have held Ford production of automatic transmissions at less than half of scheduled output of 20,000 units per month.

Transmission Statistics

During the first quarter of this year, Breech said, 18 pct of Ford cars were equipped with automatic transmissions while 33 pct of the Chevrolets sold had automatic transmissions. Because of government restrictions, only 33 pct of Mercurys are so equipped, Breech said, compared with 66 pct of Pontiacs, 75 pct of Buicks and 99 pct of Oldsmobiles. Chrysler equipped 41 pct of its cars with automatic transmission, Breech said.

Ford-built transmissions contain 25 lb of aluminum and 2 lb of copper. It takes more than 700 machine tools to produce automatic transmissions for Ford and Mercury cars. Nearly 100 machine tools were designed especially for Ford production.

The Ford investment at the Cincinnati plant in machines, tools and equipment aggregates more than $17,500,000. Included in the list of more than 400 major parts are 15 parts made of cast iron and 130 components made of carbon steel. There are 99 alloy steel parts, 24 alloy die castings, 21 parts made of copper and lead base alloys and 24 components made of rubber and cork.

Inequality of Sacrifice

"There is no justification for asking one group of manufacturers, and the thousands of people they employ, to bear the larger part of the sacrifice entailed in our rearmament program than other manufacturers and other employees similarly situated," Breech said.

Ceilings on passenger car prices not similarly imposed on other products until recently have worked a hardship on the automobile industry, according to Breech. The 3½ pct increase allowed has permitted Ford to recover only

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about 1/3 of its increased costs up to March. Breech told Ford suppliers. Materials costs have advanced since that time and automobile industry wages will increase 7¢ per hr in June under the terms of its labor contracts.

Many examples of ultra-modern high production tooling were shown to suppliers and members of the press at the new transmission plant. A transfer machine 135-ft long, mills, drills and spot-faces the case. Castings are fed into the line. When they emerge, only 3 finishing operations are needed. Red lights, placed at intervals along the line, warn the operator when a change in tooling is required.

All transmission parts except small screws, nuts and washers are fabricated at Cincinnati. Suppliers furnish die castings, forgings and steel stock but from that point the plant assumes all manufacturing responsibilities in producing Ford transmissions.

Marvin L. Katke, division manager, and Irving A. Duffy, vice-president — purchasing, also addressed visitors at the opening.

Ore, Scrap Shortage to Close British Mills

Shipowners taut link in supply chain . . . Must ship faster, find new space for mill-bound ore . . . Year's 9 million tons already purchased . . . Scrap inventories show continued drop.

London—The logistics of supply have caught up with British iron and steel mills. Working at top or near-top production they are outstripping ore and scrap supplies. Three Wales steelworks will soon be closed for lack of needed pig and scrap iron.

Taut link in the supply chain are shipowners whose bottoms this year must carry 9 million tons of iron ore contracted for by home mills. They have been asked by the Minister of Transport to ship faster and find more space for mill-bound ore.

Stocks of imported iron ore in the United Kingdom fell by 50 pct between last September and mid-March 1951. The 1 million-plus tons on hand in September represented an all-time high.

Scrap Inventories Off

Steelmakers in Sheffield and other mid-England towns foresee a drop of 10 pct in steel output in the next few months if raw material supplies do not improve.

Steel output in April fell to an annual rate of 16,771,000 long tons, compared with a yearly level of 16,822,000 tons in April 1950. Production then was adversely affected by the Easter holiday.

Dwindling scrap inventories are a common headache for steelmakers. Official March figures show scrap stocks at steel plants and foundries were down 64,000 tons from the Jan. 1 inventory of 618,000 tons. March 1950 stocks were 822,000 tons.

Pig iron stocks at steelworks and foundries dropped 65,000 tons in March to 319,000 tons, a fall of 153,000 tons since Jan. 1. Inventory on Mar. 31, 1950, was 499,000 tons. Supplies on hand have slumped further since the March tally.

More than 1200 steelworkers will be left dangling when the Wales mills close. Part of these might be absorbed by the new Abbey Works of the Steel Co. of Wales which has been unsuccessful in recruiting sufficient labor with needed steelmaking skills.

Nonferrous Stocks

Closure of the plants would anticipate a development recognized as early as 1945. At that time the British Iron & Steel Federation indicated opening of the Abbey Works near Margam would duplicate and possibly force closure of the older mills. Present steel demand, however, has made continued use of the old plants necessary.

Stocks of nonferrous metals held by the Ministry of Supply at the end of February included: Virgin copper, 94,000 tons, a drop of 10,000 tons since Jan. 1 and lowest since March 1949; virgin zinc, 32,600 tons, or 3700 tons below Jan. 1 and lowest in 2 years; zinc concentrates, 74,000 tons, down 14,600 tons in the 2 months.

Refined lead, 45,300 tons, 16,700 tons down and lowest since April 1949; and 1900 tons of virgin tin, compared with 8800 tons on Jan. 1.

In addition, the Government held the following stocks abroad at the end of February: Copper, 47,500 tons; zinc, 6800 tons; lead, 34,300 tons. Figures exclude quantities in transit to the U.K. and, except for copper, at foreign ports.

MUCH OUT OF LITTLE: Wheeling Corrugating Co., Wheeling, W. Va., gives a helpful hint on metal saving. Piece of metal on the left has been expanded on a press with a serrated knife blade from the solid steel sheet on the right. Wheeling says five times the area is covered and much the same strength of the original sheet retained.

Granite City to Build Coke Ovens

Pittsburgh—Granite City Steel Co. has awarded a contract for a battery of 27 chemical-recovery coke ovens to the Koppers Co. The new ovens will raise carbonizing capacity at the plant to 1830 net tons of coal per day.

Granite City bought the existing 49-oven plant and two adjacent blast furnaces from Koppers last February as part of its expansion program.

Certificates of Necessity Approved by DPA Now Total 1290

Washington—Fast tax amortization for 81 new or expanded facilities were authorized between May 11 and May 18 by the Defense Production Administration. Total of all certificates issued to May 18 is 1290. Full amount eligible for amortization on these facilities is $5,596,946,532.

Certificates included in the latest report of DPA, listed by company, use, amount applied for, amount eligible, and pct approved, are:

Sunbury Wire Rope Mfg. Co., wire, $1,470,000, $1,470,000, 60.

Goodard & Goddard Co., cutting tools, $276,008, $276,008, 80.

Chesapeake & Ohio RR. Co., transportation, $6,180,000, $6,180,000, 65.

New York Central RR. Co., transportation-rail, $3,050,000, $3,050,000 80; $2,895,000, $2,895,000, 80; $3,075,000, $3,075,000, 80; $3,075,000, $3,075,000, 80.

Pittsburgh & Lake Erie RR. Co., transportation, $3,092,500, $3,092,500, 80.

Wendt-Sonis Co., carbide tipped tools, $331,941, $331,941, 80.

Standard Lime & Stone Co., high magnesia magnesite, $310,381, $268,859, 85.

Dow Corning Corp., silicon metal, $560,000, $560,000, 75.

Mid-South Refrigerated Warehouse Co., storage of foods, $1,920,000, $1,810,000, 65.

Pittsburgh & Lake Erie RR. Co., transportation, $8,290,500, $8,290,500, 80; $3,065,000, $3,065,000, 80.

Quaker City Cold Storage Co., Inc., storage of foodstuffs, $160,000, $160,000, 65.

Aluminum Co. of America, extruded shapes, $170,200, $170,200, 75.

Aluminum Co. of America, extruded shapes, $600,000, $600,000, 75.

H. Kramer & Co., bronze ingots, $1,454,000, $1,347,000, 75.

Tennessee Steel Corp., steel shapes, bars, strips, $9,580,000, $9,580,000, 65.

Southwest Steel Rolling Mills, steel bars and shapes, $1,200,000, $950,000, 65.

Sheffield Steel Corp., coal, $4,000,000, $4,000,000, 85.

DeBardeleben Coal Corp., coal, $766,350, $766,350, 85.

Republic Steel Corp., alloy bars and wire, $255,000, $255,000, 60.

Southern Railway Co., transportation, $17,377,643, $17,377,643, 65.

Wallingford Steel Co., steel strip, $101,000, $101,000, 60.

Wallingford Steel Co., ordnance supplies, $1,015,000, $1,015,000, 60.

Great Northern Ry. Co., transportation, $14,650, $14,650, 65.

Wallingford Steel Co., metallic tubing, $478,000, $478,000, 60.

Brown & Root, Inc., tank hulls, turrets, $1,502,000, $1,502,000, 75.

Precision Boring Co., drill jigs, $21,361, $21,361, 90.

Simpson Barge Co., transportation, $120,000, $120,000, 80.

American Smelting & Refining Co., sulphuric acid, $700,000, $610,375, 70.

United Drill & Tool Corp., cutting tools, $581,269, $581,269, 85; $889,275, $889,275, 80.

American Smelting & Refining Co., magnesium ingots, $127,944, $127,944, 75.

Crane Co., titanium metal, $162,500, $162,500, 90.

Norton Co., grinding machines, $171,237, $171,237, 90.

Phillips Oil Co., gasoline, $40,766, $40,766, 75.

The West Co., Inc., closures, $396,427, $393,427, 75.

Fontaine Truck Equip. Co., Inc., special trailers, $202,333, $177,683, 80.

Chicago, Rock Island & Pacific RR. Co., transportation, $7,264,700, $7,264,700, 80.

Island Creek Fuel & Transp. Co., transportation, $749,875, $261,916, 80; $357,000, 70.

Reading Co., transportation, $7,310,705, $6,859,614, 80.

Monarch Machine Tool Co., metal-working lathes, $1,248,318, $1,223,618, 80.

Pollak Engineering & Mfg. Corp., antenna supports, $71,281, $71,281, 90.

Bridgewater Mfg. Co., pylon adapter, blast tubes, $14,649, $14,649, 90.

Norfolk & Western RR. Co., transportation, $33,850,000, $32,050,000, 80; $1,800,000, 65.

Garfield Chemical & Mfg. Corp., sulphuric acid, $3,583,000, $3,583,000, 70.

Erie RR. Co., transportation, $1,842,888, $976,888, 80; $866,000, 70.

New York Central RR. Co., transportation, $3,511,750, $3,511,750, 65; $212,814, $212,814, 65; $944,000, $944,000, 65; $6,038,119, $6,038,119, 65; $1,065,190, $1,065,190, 65; $1,590,907, $1,590,907, 65; $357,021, $357,021, 65; $7,508,340, $7,508,340, 65; $1,994,272, $1,994,272, 65; $1,233,166, $1,233,166, 65; $1,170,268, $1,170,268, 65; $6,054,000, $6,054,000, 65; $1,808,748, $1,808,748, 65; $774,716, $774,716, 65; $1,160,752, $1,160,752, 65; $1,994,000, $1,994,000, 65.

Norton Co., grinding machines, $5,770,507, $5,770,507, 75.

Best Cotton Co., raw cotton, $143,874, $137,374, 65.

Jennings Cotton Co., raw cotton, $144,674, $137,374, 65.

Southland Oil Corp., storage, $450,080, $450,080, 70.

Duff Norton Mfg. Co., forgings, $50,775, $50,775, 75.

Interstate Drop Forge Co., steel forgings, $420,846, $420,846, 75.

Bristol Laboratories, Inc., penicillin, $4,345,278, $4,345,278, 65.

Koppers Co., Inc., transportation, $2,794,341, $2,794,341, 80.

Semet-Solvay Div. Allied Chemical & Dye Corp., coke, $12,500,000, $11,575,500, 85.

Terminal Oil Co., transportation, $160,000, $160,000, 80.

Simpson Towing Co., transportation, $120,000, $120,000, 80.

U.S. Steel Co. Lists PA's

Pittsburgh—U. S. Steel Co. has announced the following purchasing department appointments:

J. E. Hanly, purchasing agent, chemicals, ferroalloys, and oils.

R. J. MacKenzie, purchasing agent, and R. D. Crowley, assistant purchasing agent, construction materials and services.

R. M. Brown, purchasing agent, and W. W. Crawford, B. D. McMillen, assistant purchasing agents, electrical and mechanical equipment.

R. F. Dyson, purchasing agent, iron and steel scrap.

J. A. Wrieth, purchasing agent, and A. E. DeWall, S. A. Witt, assistants, mill supplies.

A. Siragusa, purchasing agent, nonferrous metals.

R. Muirhead, purchasing agent, office equipment and supplies.

E. R. Sherrick, manager, and J. S. Hess, assistant manager, raw materials.

"How promising is my career around here? I got an offer to become a wife."

Metalworking Industry Used 86,066,678 Gal of Paint in 1950

New York—To finish its products, the metalworking industry in 1950 used 86,066,678 gal of air-drying enamels, baking enamels, lacquers, varnishes, japan, and other paints, according to a survey conducted by THE IRON AGE's Market Research Div. Paint used for protective coating in maintenance of factories and equipment was not included in the survey.

The total figure for all the metalworking industry was reached by expansion of a sample slice of the field, consisting of 2020 replies. The firms returning questionnaires employed 1,239,306 production workers and constituted 21.4 pct of industry coverage.

With the primary metals industry in the lead, 742 firms reported they did not use the paints listed. Consumption was then based on the remaining 1278 plants which did use paints listed. Total consumption of 8 categories of industries within the sample amounted to 18,942,260 gal.

Use Industrial Waste Materials

New York—Pay attention to industrial waste matter as a means to recover materials and make the most of resources, said John K. Knighton, general sales manager of Servel, Inc. He urged industry to embark on an intensified program of industrial research to salvage waste resources and materials.

Plan Two More Tube Plants

Elmira, N. Y.—Westinghouse Electric Corp. will build two new plants for manufacture of electronic tubes. H. K. Ferguson Co. will design and construct the plants, one at Horseheads and another at Bath, N. Y. The two plants will employ 3000 persons.

Gondola Cars for Lone Star

Pittsburgh—Greenville Steel Car Co. will build mill type gondola cars for the Lone Star Steel Co., Dallas, Tex.

UNIVERSITY OF MICHIGAN LIBRARIES

Salesmanship Vital in Getting Defense Work

Enterprise biggest asset in selling productive capacity . . . DPA tunes thinking to small man's problems . . . Government policy aimed at spreading work . . . New DPA booklet helpful.

New York—As operator of a small business, enterprise and salesmanship are still your biggest assets in getting defense business. Your government can and is making a bigger effort to help you do this job.

A potent political factor is forcing more government attention to problems of small business. Not all efforts are meeting with equal success. One that does help is DPA's booklet "Mobilization Guide for Small Business," available at local Dept. of Commerce offices.

Here DPA's 4-point policy to help small business is clearly stated. It aims to: (1) Bring every qualified producer possible into the defense picture; (2) find and use productive facilities of small firms; (3) give more information on how to get defense work; (4) make it easy for small business and prime contractors to get together by simplifying procurement procedure.

Early Start Helpful

Don't expect anyone to walk into your office with a contract. The burden of getting a contract as always, will be up to you. But as the successful operator of a small business, you more than anyone, know the importance of selling yourself and your plant. Your product today is productive capacity.

Time is your most precious material. Getting an early start has always been an important part of salesmanship.

You can get plenty of help from government offices in meeting materials problems, locating prospective business. getting management and technical assistance, and aid in meeting financial and tax problems.

Some government policies are handicapping the small businessman. Paperwork is piling up more rapidly than it can be processed. OPS deadlines for CPR 22 and 30 have been extended to July 2. The cost of help to process reports adds to payrolls but adds nothing to product value.

Some small businessmen have their doubts about the Armed Services shows. The big jamborees such as those recently held in Boston and Chicago gave the small businessman few concrete returns.

Shows Accomplish Little

Some prime contractors feel they were dragooned into the shows, and that little was accomplished which they could not do just as well at home. They added many potential subcontractors to their "lists" for future reference. The number of contracts signed in relation to the number of businessmen attending has to date been small.

Lack of clear-cut procurement policies needlessly complicated bidding on Air Force machine tool rebuilding at Robbins Field, Ga., recently. The requirement that full categories be processed following bidding on lots, use of the time factor in bidding, and inclusion of parts on a cost only basis were especially objectionable.

Industry Controls This Week:

NPA Orders

M-1, Alloying metals—Directive to steelmakers orders them to stop use of and wait instruction on use of nickel, molybdenum, cobalt and columbium in alloy and stainless steels. Covers June melt schedules.

M-1, Stainless steel—Instructions require steelmakers to make available increased percentages of stainless steel products for DO rated orders for third quarter shipment.

NPA Del. 5. Mining machinery amendment—Interior Dept. returns to NPA allocation and priority controls over manufacture and distribution of mining machinery. Responsibilities for production facilities of minerals and metals are retained by Interior. Effective May 22, 1951.

Del. 12, Exports—NPA may assign exporters the right to use DO-ratings to obtain copper, aluminum and steel, including tinplate, which they are licensed to export. Effective May 23.

Del. 1, Supp. 1, Bearings—Defense secretary may reschedule deliveries of military aircraft instrument bearings. Effective May 23, 1951.

DPA Orders

DPA-1, Requirements—Assigns 19 government agencies responsibility for estimating material requirements for sections of economy under their jurisdiction. Estimates are to be submitted to DPA for use in figuring CMP allotments.

OPS Orders

GCPR, Amend. 1, Coke distributors' —Distributors added to pricing regulations covering coke, coal, chemicals and coke-oven gas.

CPR-30, Aircraft — Amendment makes aircraft and parts subject to regulation. Under GOR-9, Amend. 1 aircraft and parts sold to Federal agencies for military use only are exempt from price controls. Effective May 28, 1951.

Deadline—Deadline for CPR 22 and CPR 30 moved up to July 2 from May 28.

Machinery—Permits manufacturers with gross annual sales under $250,000 to elect to price under CPR-30 or GCPR. Effective May 28, 1951.

OPS Shows Mercy by Extending Deadline of CPR 30, 22 to July 2

Washington—OPS has made two important revisions in the price-control regulation (CPR 30) applying to sales of machinery and machine tools.

The agency extended to July 2 the deadline for filing reports under CPR 30 and the general manufacturers' order (CPR 22).

It warned that no further extension would be granted, thus set-

ting July 2 as the effective date for rollbacks to pre-Korea levels, plus some labor and materials cost hikes.

In another action, OPS amended CPR 30 to permit manufacturers grossing less than $250,000 annually to remain under the general price freeze (GCPR) if they wish.

OPS said it recognized that many small firms lack the records needed to make the calculations required by CPR 30. Those electing to price under GCPR may not utilize CPR 30 for any of his products, OPS warned.

Aircraft and aircraft parts were added to coverage of CPR 30 last week. OPS said they were omitted inadvertently in the original regulation.

NPA Puts Strict Controls On Acceptance of Car Axles, Rails

Washington—Highly suspicious of "brokers" who have no historical basis for dealing in used car axles, rails and other railway equipment, NPA is moving to choke off possible speculation and diversion of such products.

Scheduled for announcement this week was an order which would slap tight control on acceptance of these items. The proposed order would prohibit either sale or acceptance of amounts exceeding 10 tons without specific authorization by NPA.

A strict reporting system would be set to check supply.

Locomotive Builders Get Steel

Washington—NPA has directed that enough steel, copper, and aluminum be provided during the third quarter to assure building of 250 road-type locomotives.

Programmed are 79,000 tons of carbon steel, 14,000 tons alloy steel, 12,500,000 lb copper, and 2,400,000 lb aluminum.

Supplies will be proportioned as follows; Electro-motive Div., GMC, 59.4 pct; American Locomotive Co., 23.5 pct; Baldwin-Lima-Hamilton Corp., 12.2 pct, and Fairbanks-Morse Corp., 4.2 pct. Percentages were based on 1947-48-49 average production.

Include Distributors in Coal Order

Washington — OPS has added distributors of coke, coal, chemicals, and coke-oven gas to the pricing regulation (GCPR, Amend. 1, SR 13) establishing ceiling prices over these products. The word "distributor" was omitted from the original order and was inserted this time.

WSB Committee Gets Task Of Enforcing Wage Freeze Orders

Washington—Problem of enforcing wage-freeze regulations has been turned over to a tripartite committee of the Wage Stabilization Board. Labor, industry, the public are represented.

Milton M. Olander and Richard P. Doherty are the two industry members of the new tripartite committee. Harry C. Bates and Joseph A. Beirne represent labor, and William M. Hepburn and Nathan P. Feinsinger are to represent the public.

The Defense Production Act provides for criminal penalties which subject both employers and employees who wilfully violate the law to a fine of not more than $10,000, or imprisonment of not more than 1 year, or both.

Auto Parts Makers Disagree

Washington—Steel, copper and aluminum to be made available to manufacturers of automotive replacement parts would be based on the quantity consumed during the first quarter of 1951, according to present CMP plans.

This proposal, however, has been sharply objected to by the industry representatives who contend allocations should be based on sales volume during 1950. They have requested that the industry be allocated 112 pct of last year's sales.

Instrument Bearings on NPA List

Washington — Instrument bearings for military aircraft have been added by NPA to the list of items for which deliveries may be rescheduled by the Defense Dept., so as to go to the plants which need them most.

Third Quarter Drilling to Get 351,000 Tons of Casing and Tubing

Washington—Some 4000 oil and gas operators will get a total of 351,000 tons of casing and tubing for third quarter drilling programs under priorities aid provided by M-46.

Authorizations issued to these operators will permit use of DO-48 ratings on orders to be delivered from regular rollings of steel pipe mills after July 1.

Balance of the 450,000 tons of casing, tubing, and pipe allocation for the third quarter drilling program is to be assigned as follows:

For export, including 13,200 tons for Canada, 53,200 tons; for wildcat emergency field stocks, 22,000 tons; domestic drilling programs, 21,000 tons, and miscellaneous drilling, such as for sulfur and brine, 2000 tons.

Applications for fourth quarter authorizations must be filed with Petroleum Administration for Defense before June 30. Unused third tonnages are to be reported back for reassignment.

K-F to Start Sub-Assembly For C-119; Car Output Resumed

Detroit—Kaiser-Frazer expects to start sub-assembly operations for Fairchild C-119 Packet airplanes during June. First complete planes are scheduled for late this year. Machine tools are being installed at Willow Run at the rate of about 50 per week. Approximately a million sq ft of the former bomber plant are being utilized for the C-119 project.

For dual production of planes and autos, K-F had to relocate eight paint spray booths, eight 200-ft ovens, nine floor conveyors and two 120-ft carrousel conveyors. Approximately 3800 ft of trim lines and 6200 ft of floor track were moved. It was also necessary to relocate an 850 x 39-ft concrete loading dock. Automobile production was resumed at Willow Run last week.

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Small Business Can Help

THE IRON AGE offers a special service to prime contractors who want acceptable bidders on subcontract work. This service is offered free in an effort to bring prime contractors and subcontractors together. Send a picture or simple inked sketch of the part to be subcontracted, with the part number, approximate size, tolerances, material, machine work needed and quantity required to:

"Can You Make It?" Editor
The Iron Age
100 East 42nd Street
New York 17, N. Y.

Pontiac Builds Guns, Planes

Detroit—More than a million sq ft of floor space is being added to defense facilities at Pontiac Motor Div. of General Motors. Production of medium-caliber cannon will be concentrated in a 446,745 sq ft building to be occupied this fall. Work at Pontiac will require 1250 additional machine tools to perform 1800 operations.

The second new building, comprising 620,900 sq ft, will be utilized to produce the "Otter," an amphibious cargo carrier. The building is scheduled for completion early in 1952.

Pontiac is presently utilizing 1300 outside suppliers to furnish parts, assemblies, materials, jigs, fixtures, machines, tools, dies and maintenance items.

Subcontractors' Role Large

Pittsburgh—Subcontractors got 64 pct of total military bookings of the Electronics and X-Ray Div. of Westinghouse Electric Corp. last year. Suppliers and subcontractors from 32 states and Canada numbered 2361.

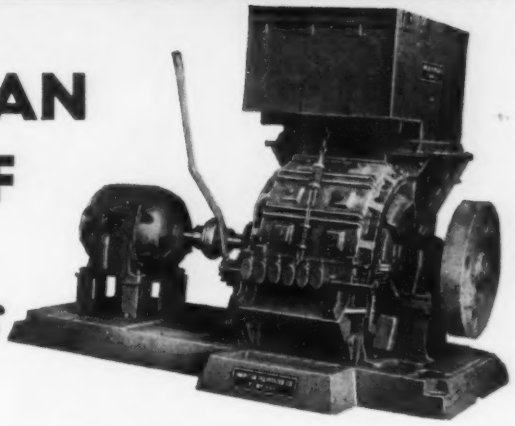
Ryan Gets Ford Motor Orders

San Diego, Calif.—Ryan Aeronautical Corp. has received a $3.5 million contract from Ford Motor Co. to make jet engine components and exhaust systems. Ryan also holds orders from General Elec-

In One Plant 5 AMERICAN METAL TURNINGS CRUSHERS

Produced $100,000 in Extra Profits Last Year

An AMERICAN PAYS OFF *3 Ways*



1 HIGHER SCRAP VALUE. The total tonnage of machine turnings reduced to shovelling chips in this one plant was over 30,000 tons for the year. With shovelling chips having a present market value of $4.00 more per ton than machine turnings—this volume would produce an **additional gross profit of over $100,000.00.**

2 CUTTING OIL RECOVERY. Turnings reduced to chips will release greater amounts of cutting oil and are more easily handled in chip wringers. American-reduced chips will release **30 to 50 gallons of cutting oil per ton,** resulting in a savings in oil alone that will more than pay for an American Metal Turnings Crusher installation in your plant.

3 EASIER STORAGE & HANDLING. **Save up to 75% of your storage space.** Chips are easier to handle, permit faster, heavier loading in freight cars, and they are ideal for briquetting purposes.

WRITE for Bulletin on Metal Turnings Crusher

American PULVERIZER COMPANY

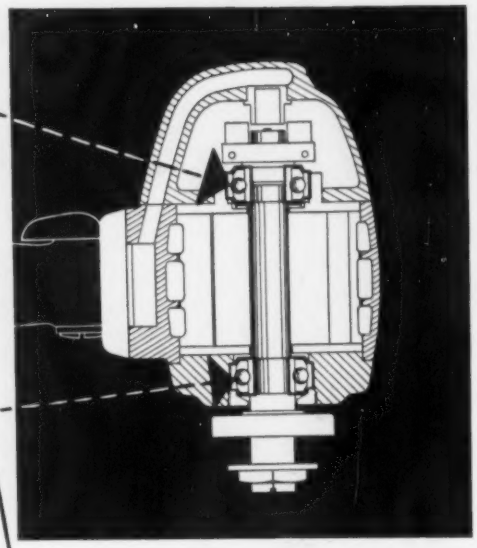
Originators and Manufacturers of Ring Crushers and Pulverizers

1439 MACKLIND AVE.
ST. LOUIS 10, MO.

Now!

for Buckeye Heavy-Duty GRINDERS, SANDERS, BUFFERS

completely sealed pre-lubricated bearings



Medium-duty vertical grinder, one of many Buckeye tools equipped with pre-lubricated bearings.

lifetime lubrication

longer tool service life

eliminate lubrication costs

NOW—when every tool is needed for full-time service, Buckeye introduces portable air tools equipped with completely sealed, pre-lubricated bearings.

NOW—with bearings that never require lubrication, tools stay in service longer . . . there's less down-time due to lubrication faults . . . tool maintenance time is reduced—and you'll save every penny formerly spent on bearing lubrication.

NOW—this newest Buckeye engineering development is just one more reason why, in portable air tools, the best buy is Buckeye.

Buckeye Tools CORPORATION
DIVISION 11 • DAYTON 1, OHIO

Portable Air and Electric Tools for Industry

Controls Digest

Continued

tric, Continental, Westinghouse and Pratt & Whitney. Exhaust systems for Continental will be used in the M-46 Patton tank. Ryan is now building a new jet engine parts factory.

Fruehauf Needs Many Suppliers

New York—Large manufacturers, frequently accused of hogging the defense picture, could not get along without small companies to help them, according to Roy Fruehauf, president of Fruehauf Trailer Co. Fruehauf's 2745 suppliers come from 38 states.

USAF Orders Fighter Bomber

Washington—The Air Force has ordered the F-94D into production, a single seat, fighter bomber version of the Lockheed F-94. It will be powered by a Pratt & Whitney J-48 jet, rated at 6250 lb of thrust, and similar in appearance to the F-94C interceptor.

Small Businessmen Organize

Washington—Some 40 small industrialists have organized to fight efforts to abolish the Reconstruction Finance Corp. and to assure small companies a bigger part in the defense program. Ed Stevens of Dawson, Ga., was elected president of the American Assn. of Independent Industrialists.

Temco to Make P5M-1 Component

Dallas—Texas Engineer & Mfg. Co. will build major assemblies for Glenn L. Martin Co.'s P5M-1 flying boat, a patrol bomber. Temco already holds contracts from Boeing and Lockheed airplane companies.

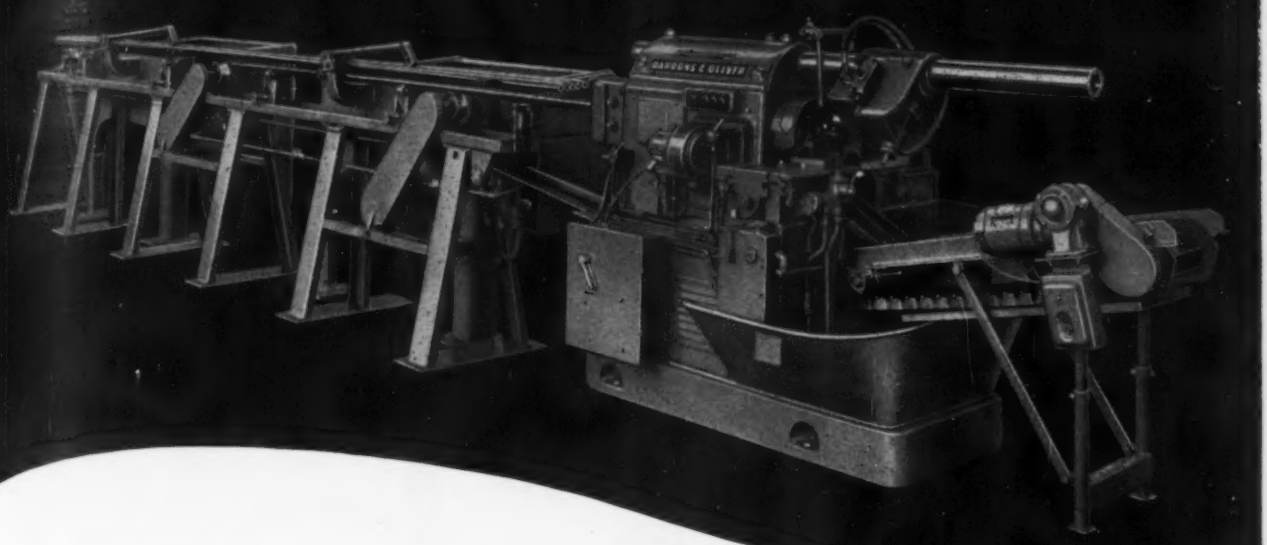
Copper, Aluminum Scrap Changes

Washington—No changes in present orders affecting scrap tin, lead, zinc, and cadmium, are in immediate prospect, NPA said this week. However, the agency said, scarcities make necessary some changes in the copper and aluminum scrap orders.

UNIVERSITY OF MICHIGAN LIBRARIES

Automatic Loading of the Cutoff Machines

GREATLY REDUCES THE COST OF MACHINING COUPLING BLANKS AND MANY OTHER SIMILAR PARTS MADE FROM TUBING AND PIPE



As shown above, the full lengths of pipe or tubing are fed automatically to the BARDONS & OLIVER NO. 34 HYDRALECTRIC CUTOFF MACHINE. The loading table has capacity for an average size bundle of pipe or tubing.

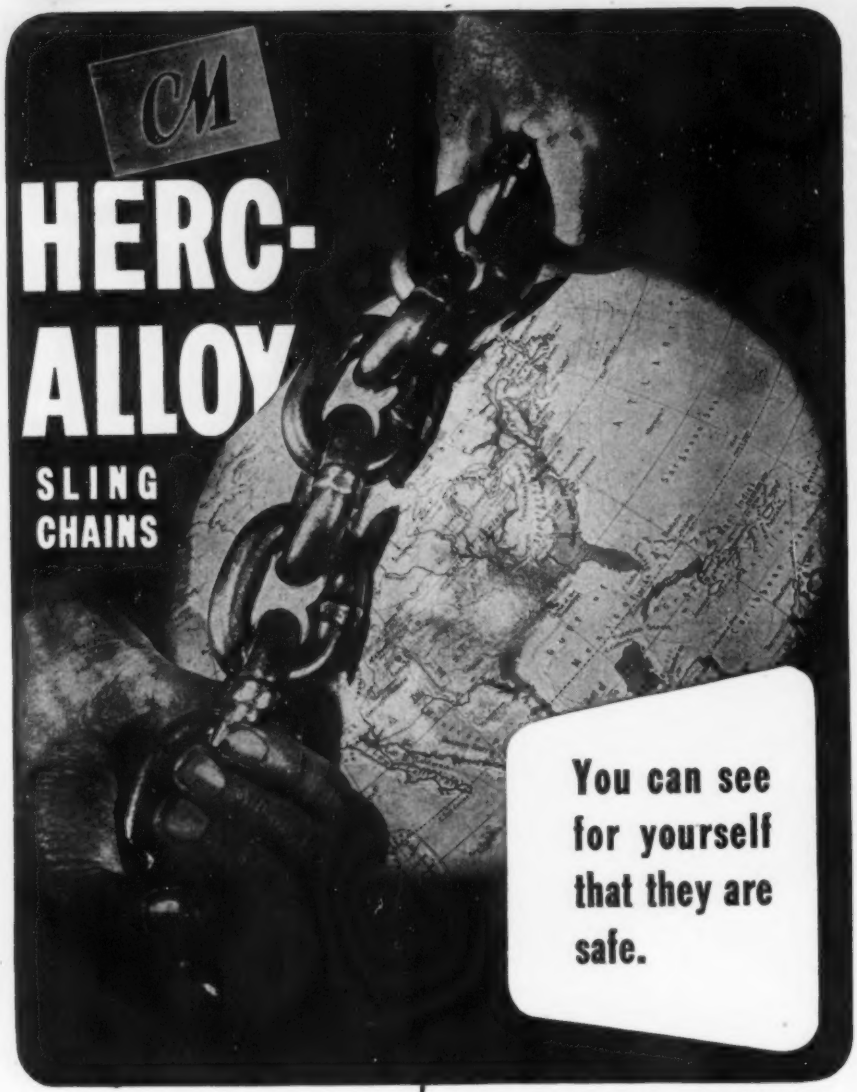
The chips are removed by the motor driven conveyor.

Reduced labor cost and increased production make the BARDONS & OLIVER NO. 34 HYDRALECTRIC CUTOFF MACHINE WITH AUTOMATIC LOADING TABLE an outstanding investment.

WE BUILD A FULL LINE OF RAM TYPE TURRET LATHES, AS WELL AS A COMPLETE LINE OF CUTOFF MACHINES

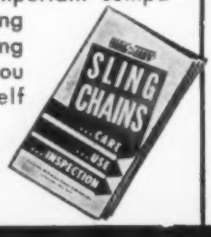
BARDONS & OLIVER, INC.

1133 WEST 9TH STREET • CLEVELAND 13, OHIO



Just one of the big advantages of HERC-ALLOY Sling Chains is that you can determine their serviceability by a simple visual inspection.* Ordinary steel or iron chains, on the contrary, grow dangerously brittle with age... an insidious threat to the safety of men and materials. That's why more and more of the important companies are standardizing on HERC-ALLOY Sling Chains...because you can see for yourself that they're safe.

*Write for your copy of this new, informative booklet. No charge.



HERC-ALLOY FEATURES

- America's *first* alloy steel sling chain...first to bear a serial number.
- *Every* CM HERC-ALLOY Sling Chain is alloy steel throughout...links, rings, hooks. There is only one grade...*the best.*
- Every chain is individually tested and accompanied by a certificate of registration.
- Links are side welded for maximum strength by patented INSWELL electric method.
- HERC-ALLOY Chains should never be annealed.
- HERC-ALLOY Chains are lighter...stronger...easier to handle...outlast ordinary chains 4 to 5 times...cost less on the job.

HERC-ALLOY...the chain you can *SEE* is safe

COLUMBUS-McKINNON
CHAIN CORPORATION
(Affiliated with Chisholm-Moore Hoist Corporation)
GENERAL OFFICES AND FACTORIES: TONAWANDA, N. Y.
SALES OFFICES: New York • Chicago • Cleveland • San Francisco • Los Angeles

STEEL CONSTRUCTION NEWS

New York—April bookings of fabricated structural steel, as reported to the American Institute of Steel Construction, totaled 257,658 tons, an increase of 9.3% over March. The first four months' bookings this year have totaled 985,486 tons, 69.4% greater than in the same period of 1950. For the past twelve months bookings have averaged 244,492 tons, for a total of 2,933,906 tons.

April shipments totaled 192,590 tons, down 5.5% from March. The first four months' shipments amounted to 746,791 tons, or an increase of 27.4% over the previous year's similar period.

The backlog (tonnage available for future fabrication) for the next four months only, amounts to 806,763 tons, and beyond that period another 1,640,679 tons of work stands on the industry's books, or a potential volume of work ahead of 2,447,442 compared with 2,313,336 tons at March 31st.

Estimated Total Tonnage for the Entire Industry

CONTRACTS CLOSED	1951	1950	Avg. 1936/1940
January	287,290*	119,317	107,578
February	204,786*	117,664	96,290
March	235,752*	189,420	124,558
April	257,658	155,011	110,783
Totals	985,486	581,412	439,199
SHIPMENTS			
January	187,016*	135,253	92,578
February	168,371*	129,628	88,636
March	203,814*	156,781	115,601
April	192,590	164,440	123,650
Totals	746,791	586,102	419,885
TONNAGE AVAILABLE FOR FABRICATION			
Within next 4 months (To Aug. 31, 1951)	806,763	540,213	319,140
After next 4 months (From Sept. 1, 1951)	1,640,679	291,185	97,777

*Revised.

Fabricated steel awards this week included the following:

3891 Tons, Boston, steel superstructure for single and double deck elevated highway structure (structural carbon and silicon steel) from North Station to West End. Completion date June 30, 1953. American Bridge Co., Pittsburgh, low bidder.

450 Tons, Philadelphia, laundry building for Philadelphia State Hospital. Bethlehem Steel Co., Bethlehem, low bidder.

200 Tons, Woburn, new building for Sylvania Electric Products Co. Thomas Worcester Inc., Boston, awarded contract.

Fabricated steel inquiries this week included the following:

670 Tons, Essex County, N. J., highway bridge for New Jersey State Dept. of Highways, bids due June 12.

600 Tons, Reading, Pa., bridge for Reading Railroad Co., bids due May 31.

Reinforcing bar awards this week included the following:

725 Tons, Boston, constructing deck and electrical work and other items for Charlestown connection of Boston Central Artery, completion date June 30, 1953. Berke-Moore Co., Boston, is low bidder.

565 Tons, Chicago, Resurrection Hospital, to B. W. Construction Co.

235 Tons, South Bend, Ind., Liberal & Fine Arts Building at Notre Dame University, McGough Bros., St. Paul, low bidder.

148 Tons, Butler, Pa., repair of a steel and concrete bridge. Bids to June 8, 1951, Department of Highways, Harrisburg, Pa.

110 Tons, Urbana, Ill., men's hall for U. of Illinois, to John Felmly Co.

UNIVERSITY OF MICHIGAN LIBRARIES

Calking lead

protects by yielding

Lead has several advantages for the calking of joints and as much as 50,000 tons of it have been used for this purpose in one year. All rigid pipe lines are subject to strains from ground movement or settlement. Being soft, and yielding, lead absorbs the stresses thus set up by permitting some joint deformation without leaking. Perhaps the greatest value of lead-calked joints is in the ease with which they can be repaired if abnormal movement has caused a joint to leak. It is costly to shut off water supplies for repairs on leaky joints, yet this is a necessary prelude to repairs if substitutes for lead are used as calking materials.

Lead, because of its softness and low melting properties, is the standard material for calking the joints of cast iron bell and spigot pipe — innumerable miles of which lie hidden under our cities to perform their vital functions as water mains and in waste systems. It can be used in the molten state or in the form of lead wool. Poured joints using molten lead are the most common, but lead wool, which requires no heat for calking, is ideal where the molten form cannot be used, as under water, or for repairs in gas lines where heat might constitute a hazard. Calking lead is available in cakes or pigs ranging in weight from ⅜ to 100 lbs., while lead wool is formed from strands of metallic lead twisted loosely into a rope.

Lead calked joints in underground mains have often served for more than 100 years and were found in sound condition when the mains were ultimately uncovered. No other pipe jointing material has such a performance record.

Chemical Requirements for Calking Lead*

Lead for calking purposes shall contain not less than 99.73 percent of lead

Maximum allowable impurities:

	Percent
Arsenic, antimony & tin together	0.015
Copper	0.08
Zinc	0.002
Iron	0.002
Bismuth	0.25
Silver	0.02

*Cast Iron Pipe Research Association

Pouring and calking lead in a large water main in New York City.

Calking Materials Required for Lead Joints in Cast Iron Water Mains*

Size of Pipe	*Approximate Weight of Lead per Joint 2 in. Deep Pounds*	*Approximate Weight of Hemp per Joint Pounds*
3	6.00	0.18
4	7.50	0.21
6	10.25	0.31
8	13.25	0.44
10	16.00	0.53
12	19.00	0.61
14	22.00	0.81
16	30.00	0.94
18	33.80	1.00
20	37.00	1.25
24	44.00	1.50
30	54.25	2.06
36	64.75	3.00
42	75.25	3.62
48	85.50	4.37
54	97.60	6.25
60	108.30	8.25
72	146.00	12.50
84	170.00	15.00

*Cast Iron Pipe Research Association

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The logical truck for such work is an electric truck. Its motor drive stays on the job because it has few wearing parts . . . *only one basic moving part.*

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EDISON batteries give you many advantages: they're mechanically durable; electrically foolproof; quickly and easily charged; simple to maintain; not injured by standing idle. Get a current EDISON price quotation—you will probably find initial cost MUCH LOWER than you think. Couple this factor with well-known EDISON long life and you will have the key to year-after-year economy.

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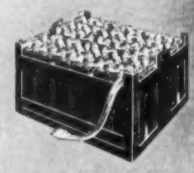
STORAGE BATTERIES



EDISON STORAGE BATTERY DIVISION

of Thomas A. Edison, Incorporated, West Orange, N. J.

In Canada: International Equipment Co., Ltd., Montreal and Toronto

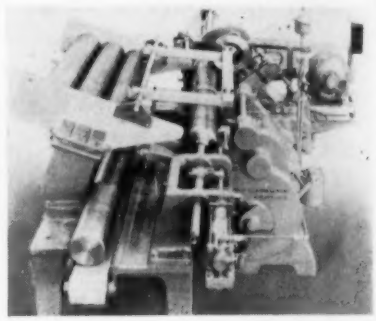
new equipment

Continued from page 38

Power-factor meter

A new hook-on meter permits direct measurement of power factor without cutting conductors or interrupting electrical service. The meter may be used on any balanced 3-phase circuit. It gives direct power-factor readings in circuits with voltages ranging from 100 to 600 v and currents from 15 to 600 amp. Small, light, and portable, the meter can be used to locate easily those circuits where corrective action is needed. *General Electric Co.*

For more data insert No. 13 on postcard, p. 35.



Shell Trimmer

A new machine, known as the No. 986 shell trimmer, has the capacity for handling 155-mm shells, with a maximum length of 52 in., maximum diam, 8¼ in., and thickness, 0.150 in. It is equipped with an automatic chute for feeding the shells, has an air-operated mechanism for locating the shells in position for the trimming operation, and is provided with automatic ejection to deliver finished shells to a conveyer. *V&O Press Co.*

For more data insert No. 14 on postcard, p. 35.

Fiber strapping

To replace restricted steel strapping for packages under 90 lb, a tough new fiber strapping called Fiberstrap stands a pull of 275 lb, retains its original tensile strength and ductility under normal conditions, and provides uniform tension. The strap has a soft, smooth surface that is non-abrasive and

Turn Page

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LOOKS LIKE THAT VERSATILE DRAVO "COUNTERFLO" HEATER CAN BE USED ON PRACTICALLY ALL OUR JOBS.

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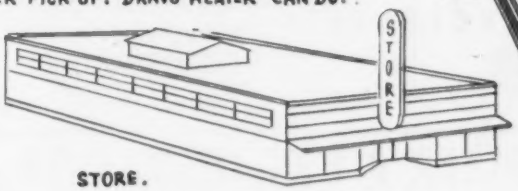
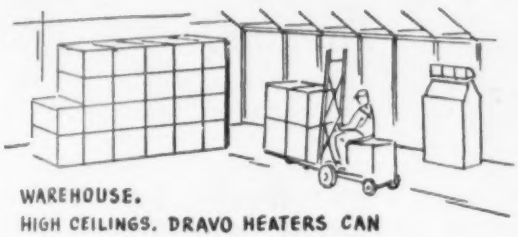
INDUSTRIAL PLANT. DRAVO HEATERS HAVE 150' AIR THROW. NO DUCTS NEEDED.

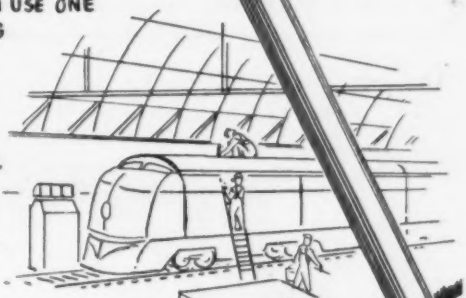
ARMY BASE.
WINTER CONSTRUCTION ON THESE BARRACKS. CAN INSTALL DRAVO HEATERS EARLY FOR HEAT DURING CONSTRUCTION AND AFTER COMPLETION.



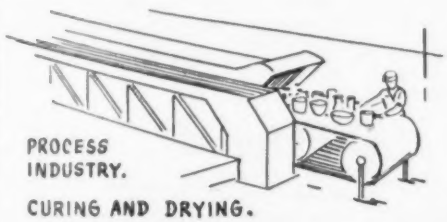
STORE.
WITH DRAVO HEATERS, CAN USE ONE SET OF DUCTS FOR HEATING AND AIR-CONDITIONING.



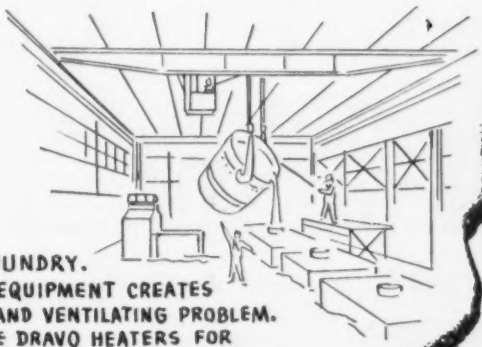
WAREHOUSE.
HIGH CEILINGS. DRAVO HEATERS CAN REDUCE ROOF HEAT LOSS, KEEP HEAT WHERE IT'S NEEDED.



DIESEL RAILROAD SHOP. NEEDS HEAT AT WORKING LEVEL. DRAVO HEATERS IDEAL.



PROCESS INDUSTRY.
CURING AND DRYING. SPECIFY DRAVO HERE.



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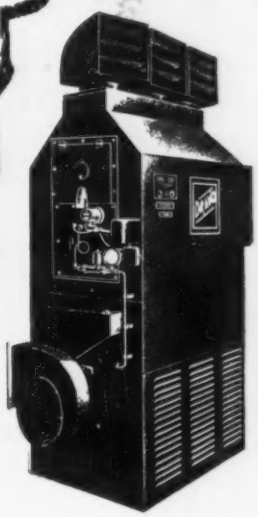
EXHAUST EQUIPMENT CREATES HEATING AND VENTILATING PROBLEM. USE DRAVO HEATERS FOR TEMPERED "MAKE-UP" AIR.



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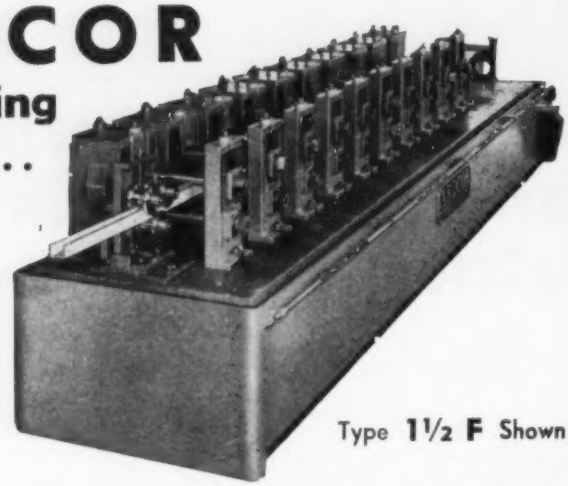

Type **1½ F** Shown

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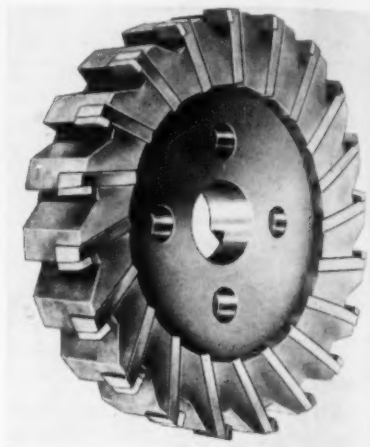
new equipment

Continued

non-adhesive. Uniform, reinforcing tensioning of Fiberstrap with the Steelbinder tool makes an adhesive surface unnecessary. Strapping is ¾ in. wide, 0.040 in. thick, and is available in 25-lb coils, 1750 ft long. *A. J. Gerrard & Co.*

For more data insert No. 15 on postcard, p. 35.



Face mill

Fewer parts, a heavier, more rigid body, a positive locking action and heat treated tool steel, carbide tipped blades are innovations of a new, removable insert face mill. The cutter is recommended for milling cast iron, steel, aluminum, brass and bronze and is said to produce an exceptionally fine finish at high table feeds. *Nelco Tool Co.*

For more data insert No. 16 on postcard, p. 35.

Drill turret

Redesign of bearings in the Lign-o-matic turret increases the life and precision of the self-centering turret, by permitting the spindles to move laterally and angularly and to rotate. The turret spindle can be moved into exact alignment with the drilling machine spindle. It is locked in position and cannot get out of alignment during the drilling operation. This patented construction guarantees sustained accuracy said to be equal to the drill press itself. *Howe & Fant, Inc.*

For more data insert No. 17 on postcard, p. 35.

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the amazing Crayons that tell temperatures

A simple method of controlling temperatures in:

- WELDING
- FLAME-CUTTING
- TEMPERING
- FORGING
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- MOLDING
- DRAWING
- STRAIGHTENING
- HEAT-TREATING IN GENERAL

Also available in pellet and liquid form

It's this simple: Select the Tempilstik® for the working temperature you want. Mark your workpiece with it. When the Tempilstik® mark melts, the specified temperature has been reached.

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gives up to 2000 readings

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113	263	400	950	1500
125	275	450	1000	1550
138	288	500	1050	1600
150	300	550	1100	1650
163	313	600	1150	1700
175	325	650	1200	1750
188	338	700	1250	1800
200	350	750	1300	1850
213	363	800	1350	1900
225	375	850	1400	1950
238	388	900	1450	2000
250				

FREE —Tempil® "Basic Guide to Ferrous Metallurgy" —16¼" by 21" plastic-laminated wall chart in color. Send for sample pellets, stating temperature of interest to you.

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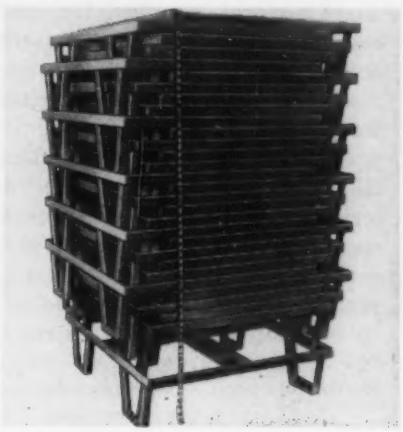
High speed recorder

A new electronic, high speed pen recorder for measuring rapidly changing variables experienced in laboratory and test applications has been developed. Full-scale signals that vary as rapidly as 20 cycles a minute can be recorded, also those with peak-to-peak amplitude of 10 pct of scale that vary as rapidly as three cycles a second. *Brown Instruments Div., Minneapolis-Honeywell Regulator Co.*

For more data insert No. 18 on postcard, p. 35.



Nesting Skids

All steel welded skids are designed for use with hydraulic and electric floor trucks. Thirty skids are easily nested in a small area, and occupy a total height of 5 ft from floor level to top of the stack. The skids are light enough to be easily handled by one man. They are available in standard models and specially designed units to meet individual requirements. *Bloom System, Inc.*

For more data insert No. 19 on postcard, p. 35.

Electric fork trucks

A redesigned line of light capacity electric fork lift trucks features simplified automotive-type controls, hydraulic lift, and compact size. They have the advantages of sit-down operation, combined with a short wheel base and maneuverability. Trucks are all-steel, electrically welded for strength and weight-saving. Capacities range to 2000 lb. *Yale & Towne Mfg. Co.*

For more data insert No. 20 on postcard, p. 35.

Resume Your Reading on Page 39

This book is for you!

You are the man for whom we compiled "3 Keys to Satisfaction," our 72 page book full of vital information, graphs, and diagrams of real significance to all interested in the application of design to materials. Every single page carries valuable data on scientific design in relation to metallurgical properties—all from the designer's viewpoint.

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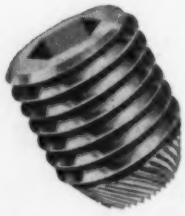
Because UNBRAKO Screws are scientifically heat treated in modern, controlled-atmosphere furnaces under the supervision of experienced operators, you get UNBRAKO Screws of extremely high tensile strength without "temper-brittleness". Write for your UNBRAKO Catalog.



Self-Locking Knurled Point Socket Set Screw

-SPS-

STANDARD PRESSED STEEL CO.

JENKINTOWN 17, PENNSYLVANIA

publications

Continued from Page 35

the engineered features described. A series of pictures shows some of the steps in the erection of this type of tank. *Graver Tank & Mfg. Co., Inc.*

For free copy insert No. 25 on postcard, p. 35.

Surface preparation

Helpful data on materials and procedures that produce the chemically clean surfaces required for black oxide finishing of metals is presented in a new 4-p. special service report. It reviews recommended materials and methods for the preparatory operations before black finishing. A special section describes how a hot-oil bath treatment for black-oxide coated parts not scheduled for organic finishing enhances the black finish and provides effective anti-rust protection. *Oakite Products, Inc.*

For free copy insert No. 26 on postcard, p. 35.

Rods and bushings

A comprehensive new 10-p. bulletin details information for users of tungsten carbide rods and bushings. It includes gram weight tables, standard tolerances for unground pieces, extra charges for special forming operations and other useful data. This information will enable carbide users to estimate prices, determine most economical quantity and shape, determine grinding stock and find necessary information pertaining to carbide rods and bushings. *Adamas Carbide Corp.*

For free copy insert No. 27 on postcard, p. 35.

Hot working steel

Prestem, the hot working die steel for forging presses and upsetters, is covered in a new 4-p. bulletin. The folder describes this new alloy steel, of the low carbon-nickel, molybdenum type, and gives hardness characteristics. A chart shows that as the temperature increases, up to approx 1050°F, surface hardness also increases. *Heppenstall Co.*

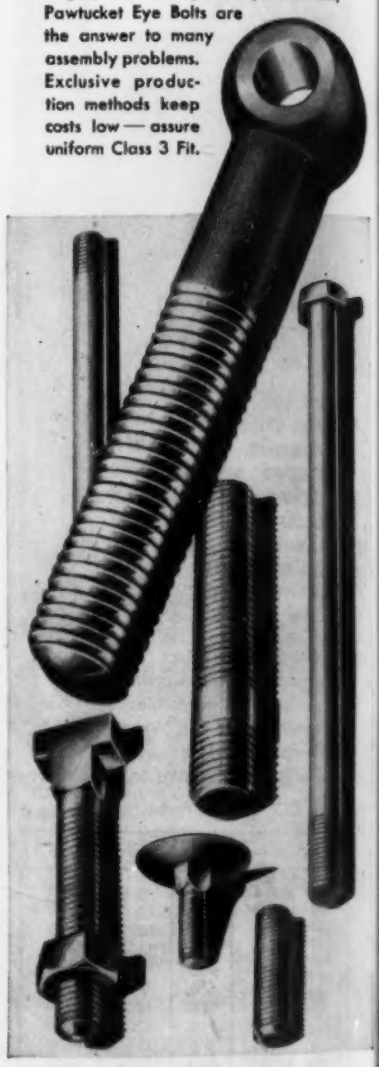
For free copy insert No. 28 on postcard, p. 35.

Resume Your Reading on Page 36

Looking for specialties?

EYE BOLTS

Accurately made in sizes ¼" and larger, or to your specifications, Pawtucket Eye Bolts are the answer to many assembly problems. Exclusive production methods keep costs low — assure uniform Class 3 Fit.



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Use Headed and Threaded Fasteners for Economy and Reliability

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T.M. REG.

IRON AGE *markets and prices*

market briefs and bulletins

television—TV production right now is in the doldrums. Sets are a glut on the market and retailers and wholesalers who bought heavily in anticipation of large-scale scare buying are wringing their hands. BUT, suppliers for TV makers report they are getting more orders for parts. TV makers are stocking tubes. It looks as though TV production, which hit 7,463,800 sets last year, will try for a comeback this fall.

Canada tightens belt—A new Canadian order, effective June 1, tightens controls on primary and wrought aluminum, primary copper, brass mill products, copper wire rod and copper wire. Buyers must get okay of nonferrous metals division of the Dept. of Defense Production. Aim is to scythe down demand stemming from fear of shortages rather than to crop legitimate non-defense needs.

gray market slipping?—Steel executives report demand for high priced gray market and imported steel has slumped—and so have prices. German plates, recently selling for more than twice the American product, are reported down $10 to $30 a ton. Demand for hot and cold-rolled sheets is also reported to be weakening.

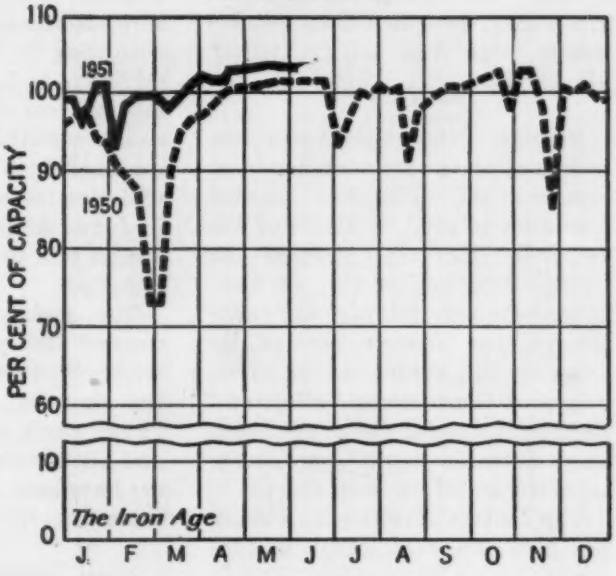
pipelines—More than 6 million tons of steel are involved in the more than 28,000 miles of natural gas pipelines now abuilding or waiting approval from authorities, according to the Gas Appliance Mfgrs. Assn. Some 12.254 miles of line are under construction at a cost of $1,001,332,000. All areas of the U. S. are getting attention in the drive to extend gas lines.

zinc deal—Barvue Mines Ltd., of Canada, will sell 175,000 tons of zinc concentrate to American Zinc, Lead & Smelting Co. of Illinois. Also in the deal are Aluminum Co. of Canada and American Steel & Wire Co. Barvue will ship concentrate to Alcan at Arvida, Que., where a $2.5 million flash roasting plant will be set up for extraction of sulfuric acid. The zinc concentrate will then be shipped to American Zinc. American Steel & Wire Co. will purchase the zinc output. Barvue will sell the zinc at 17.5¢ per lb.

labor problem—Continental Foundry & Machine Co. sold the Yugoslav government a $3,750,000 blooming mill. It was shipped last fall. Now an engineer of H. L. Brassert Co. which has the contract to erect the mill is back with a report of slow progress. He spent 14 months supervising erection of mill foundations. Because the Yugoslavs lack skilled labor it will take three times longer to set up the mill than it would in the United States.

auto costs—Use of substitutes may raise the cost of making cars. One automaker parried the aluminum shortage by use of cast iron transmission housings. The new housing requires five or six more operations than the die cast part and machining is about half the previous rate, necessitating a doubling of tool hours. In other cases use of substitute steels requires a double instead of a single quench. Tool life is shorter and feeds and speeds slower. Some experts think substitutions and changes may add $100 to the cost of a car.

Steel Operations †



District Operating Rates—Per Cent of Capacity †

Week of	Pittsburgh	Chicago	Youngstown	Philadelphia	West	Buffalo	Cleveland	Detroit	Wheeling	South	Ohio River	St. Louis	East	Aggregate
May 28	97.0*	108.0	94.0*	100.5	108.0	104.0	98.5	106.0	102.0	96.5	95.5	99.0	125.0	103.5
May 27	103.0	105.0	96.0	100.5	108.0	104.0	99.5	106.0	102.0	97.0	95.0	99.0	125.0	103.5**

* Revised.
† Beginning Jan. 1, 1951, operations are based on annual capacity of 104,229,650 net tons.
** Tentative.

nonferrous metals

outlook and market activities

NONFERROUS METALS PRICES

	May 23	May 24	May 25	May 26	May 28	May 29
Copper, electro, Conn.	24.50	24.50	24.50	24.50	24.50	24.50
Copper, Lake delivered	24.625	24.625	24.625	24.625	24.625	24.625
Tin, Straits, New York	$1.39	$1.39	$1.39	....	$1.39	$1.39*
Zinc, East St. Louis	17.50	17.50	17.50	17.50	17.50	17.50
Lead, St. Louis	16.80	16.80	16.80	16.80	16.80	16.80

Note: Quotations are going prices.
*Tentative.

by R.Hatschek

Tariff Suspended — President Truman has signed the bill (HR 3336) which suspends the 2¢ per lb copper import tariff and at long last the trade is free of that obligation. Briefly, the new law makes imported copper tariff-free from Apr. 1, 1951, until Feb. 15, 1953, or until the end of the national emergency, provided that the domestic price does not fall below 24¢ per lb.

Foreign Price Up—While one source of price confusion has been removed the split-price market continues to exist by virtue of the 3¢-per-lb increase granted to Chile. Chile Copper Co., an Anaconda Copper Mining Co. subsidiary, has already boosted its price to the equivalent of 27.5¢, delivered Connecticut Valley, and Kennecott Copper Corp., the other large outfit in South America, is expected to follow suit shortly.

The British Ministry of Supply has also raised its price on copper by 3¢ per lb to 29.25¢. This is a natural action since England will now have to pay more for Chilean copper and probably more for copper from its other sources.

Will Ceiling Lift?—Practically all of the domestic copper producers are now selling metal on a basis of price at time of delivery. This is so because they anticipate an Office of Price Stabilization order raising the domestic ceiling to 27.50¢ per lb, which would be only fair.

Scrap Ceiling Overdue—On the subject of ceilings, the long-awaited price ceiling for copper scrap is actually nearing a reality, according to Washington reports. OPS was to have issued it during the last couple of weeks but, as usual, something delayed it. Latest word is to the effect that OPS will give the order sometime early in June. A zinc scrap price order is also said to be almost ready for issuance.

The metals scrap trade was warned last week about enforcement of the General Price Regulation but as one dealer put it, "They can't put everyone in jail and all buyers as well as all sellers have been dealing at about the same prices."

More Aluminum Expansion—Now that arrangements for 451,000 tons a year of new and reactivated aluminum capacity have been pretty well taken care of, the government is out looking for an additional 500,000 tons. No details of the government plan have been announced to date but the delay, according to the government, is because they want to get some more new names into the primary aluminum business.

Apex Smelting Co., of Chicago, which dropped out of earlier plans for economic reasons, is on record as being interested in the new plan. The already planned 451,000 tons of capacity is all expected to be operative by sometime in 1952, while the newer expansion is not likely to come in for 2 or 3 years. If and when all this comes about, the U. S. will be able to produce about 1,650,000 tons of aluminum a year.

Canada Expands Controls—The Canadian Dept. of Defense Production has issued an order, effective June 1, bringing aluminum, brass and copper under control. The order requires a buyer to have his purchase okayed by the Dept. before he can get material. No cuts are planned since the order is mainly designed to prevent scare buying — at least for the present. Inventories will also be limited to immediate needs.

Purchases from warehouse stocks of aluminum are not required to have the official nod and the copper order establishes a list of authorized purchasers who need not get approval.

MILL PRODUCTS

(Cents per lb, unless otherwise noted)

Aluminum

(Base 30,000 lb, f.o.b. ship. pt. frt. allowed)

Flat Sheet: 0.188 in., 2S, 3S, 30.1¢; 4S, 61S-O, 32¢; 52S, 34.1¢; 24S-O, 24S-OAL, 32.9¢; 75S-O, 75S-OAL, 39.9¢; 0.081 in., 2S, 3S, 31.2¢; 4S, 61S-O, 33.5¢; 52S, 35.6¢; 24S-O, 24S-OAL, 34.1¢; 75S-O, 75S-OAL, 41.8¢; 0.032 in., 2S, 3S, 32.9¢; 4S, 61S-O, 37.1¢; 52S, 39.8¢; 24S-O, 24S-OAL, 41.7¢; 75S-O, 75S-OAL, 52.2¢.

Plate: ¼ in. and heavier: 2S, 3S-F, 28.3¢; 4S-F, 30.2¢; 52S-F, 31.8¢; 61S-O, 30.8¢; 24S-O, 24S-OAL, 32.4¢; 75S-O, 75S-OAL, 38.8¢.

Extruded Solid Shapes: Shape factors 1 to 5, 36.2¢ to 74.5¢; 12 to 14, 36.9¢ to 89¢; 24 to 26, 39.6¢ to $1.16; 36 to 38, 47.2¢ to $1.70.

Rod, Rolled: 1.5 to 4.5 in., 2S-F, 3S-F, 37.5¢ to 38.5¢; cold-finished, 0.375 to 3 in., 2S-F, 3S-F, 40.5¢ to 35¢.

Screw Machine Stock: Rounds, 11S-T3, ⅛ to 11/32 in., 53.5¢ to 42¢; ⅜ to 1½ in., 41.5¢ to 39¢; 1 9/16 to 3 in., 38.5¢ to 36¢; 17S-T4 lower by 1.5¢ per lb. Base 5000 lb.

Drawn Wire: Coiled, 0.051 to 0.374 in., 2S, 29.5¢ to 29¢; 52S, 48¢ to 35¢; 56S, 51¢ to 42¢; 17S-T4, 54¢ to 37.5¢; 61S-T4, 48.5¢ to 37¢; 75S-T6, 84¢ to 67.5¢.

Extruded Tubing, Rounds: 63-S-T5, OD in in.: 1¼ to 2, 37¢ to 54¢; 2 to 4, 33.5¢ to 45.5¢; 4 to 6, 34¢ to 41.5¢; 6 to 9, 34.5¢ to 43.5¢.

Roofing Sheet, Flat: 0.019 in. x 28 in. per sheet, 72 in., $1.142; 96 in., $1.522; 120 in., $1.902; 144 in., $2.284. Gage 0.024 in. x 28 in., 72 in., $1.379; 96 in., $1.839; 120 in., $2.299; 144 in., $2.759. Coiled Sheet: 0.019 in. x 28 in., 23.2¢ per lb.; 0.024 in. x 28 in., 26.9¢ per lb.

Magnesium

(F.o.b. mill, freight allowed)

Sheet and Plate: FS1-O, ¼ in. 63¢; 3/16 in. 66¢; ⅛ in. 67¢; B & S Gage 10, 68¢; 12, 72¢; 14, 78¢; 16, 85¢; 18, 93¢; 20, $1.05; 22, $1.27; 24, $1.67. Specification grade higher. Base: 10,000 lb.

Extruded Round Rod: M, diam in., ¼ to 0.311 in., 74¢; ⅜ to ¾ in., 57.5¢; 1¼ to 1.749 in., 53¢; 2½ to 5 in., 48.5¢. Other alloys higher. Base: Up to ⅝ in. diam, 10,000 lb; ¾ to 2 in., 20,000 lb; 2 in. and larger, 30,000 lb.

Extruded Solid Shapes, Rectangles: M. In weight per ft, for perimeters less than size indicated, 0.10 to 0.11 lb, 3.5 in., 62.3¢; 0.22 to 0.25 lb, 5.9 in., 59.3¢; 0.50 to 0.59 lb, 8.6 in., 56.7¢; 1.8 to 2.59 lb, 19.5 in., 53.8¢; 4 to 6 lb, 28 in., 49¢. Other alloys higher. Base, in weight per ft of shape: Up to ½ lb, 10,000 lb; ½ to 1.80 lb, 20,000 lb; 1.80 lb and heavier, 30,000 lb.

Extruded Round Tubing: M, wall thickness, outside diam, in., 0.049 to 0.057, ⅛ in. to 5/16, $1.40; 5/16 to ⅝, $1.26; ½ to ⅝, 80¢; 1 to 2 in., 76¢; 0.165 to 0.219, ⅝ to ¾, 61¢; 1 to 2 in., 57¢; 3 to 4 in., 56¢. Other alloys higher. Base, OD in in.; Up to 1½ in., 10,000 lb; 1½ in. to 3 in., 20,000 lb; 3 in. and larger, 30,000 lb.

Titanium

(10,000 lb base, f.o.b. mill)

Commercially pure and alloy grades: Sheet and strip, HR or CR, $15; Plate, HR, $12; Wire, rolled and/or drawn, $10; Bar, HR or forged, $6; Forgings, $6.

Nickel and Monel

(Base prices, f.o.b. mill)

	"A" Nickel	Monel
Sheets, cold-rolled	71½	57
Strip, cold-rolled	77½	60
Rods and bars	67½	55
Angles, hot-rolled	67½	55
Plates	69½	56
Seamless tubes	100½	90
Shot and blocks	....	50

Copper, Brass, Bronze

(Freight prepaid on 200 lb)

	Sheet	Rods	Extruded Shapes
Copper	40.18	....	39.78
Copper, h-r	....	36.03	....
Copper, drawn	....	37.28	....
Low brass	38.47	38.16	....
Yellow brass	37.28	36.97	....
Red brass	38.86	38.55	....
Naval brass	42.27	36.33	37.59
Leaded brass	....	....	35.86
Com'l bronze	40.18	39.87	....
Mang. bronze	45.77	39.80	41.36
Phos. bronze	59.42	59.67	....
Muntz metal	40.28	35.84	37.09
Ni silver, 10 pct	48.26	50.59	....
Arch. bronze	....	....	....

PRIMARY METALS

(Cents per lb, unless otherwise noted)

Aluminum ingot, 99+%, 10,000 lb, freight allowed	19.00
Aluminum pig	18.00
Antimony, American, Laredo, Tex.	42.00
Beryllium copper, 3.75-4.25% Be	$1.56
Beryllium aluminum 5% Be, Dollars per lb contained Be	$69.00
Bismuth, ton lots	$2.25
Cadmium, del'd	$2.55
Cobalt, 97-99% (per lb)	$2.10 to $2.17
Copper, electro, Conn. Valley	24.50
Copper, Lake, delivered	24.625
Gold, U. S. Treas., dollars per oz.	$35.00
Indium, 99.8%, dollars per troy oz.	$2.25
Iridium, dollars per troy oz.	$200
Lead, St. Louis	16.80
Lead, New York	17.00
Magnesium, 99.8+%, f.o.b. Freeport, Tex., 10,000 lb	24.50
Magnesium, sticks, 100 to 500 lb	42.00 to 44.00
Mercury, dollars per 76-lb flask, f.o.b. New York	$212-215
Nickel, electro, f.o.b. New York	53.55
Nickel oxide sinter, f.o.b. Copper Cliff, Ont., contained nickel	46.75
Palladium, dollars per troy oz.	$24.00
Platinum, dollars per troy oz.	$90 to $93
Silver, New York, cents per oz.	90.16
Tin, New York	$1.39
Titanium, sponge	$5.00
Zinc, East St. Louis	17.50
Zinc, New York	18.25
Zirconium copper, 50 pct	$6.20

REMELTED METALS

Brass Ingot

(Cents per lb delivered, carloads)

85-5-5-5 ingot	
No. 115	29.00
No. 120	28.50
No. 123	28.00
80-10-10 ingot	
No. 305	35.00
No. 315	32.00
88-10-2 ingot	
No. 210	47.50
No. 215	44.50
No. 245	37.00
Yellow ingot	
No. 405	25.50
Manganese bronze	
No. 421	32.75

Aluminum Ingot

(Cents per lb, 30,000 lb lots)

95-5 aluminum-silicon alloys	
0.30 copper, max.	34.50-36.25
0.60 copper, max.	34.25-36.00
Piston alloys (No. 122 type)	31.00-32.50
No. 12 alum. (No. 2 grade)	30.25-31.25
108 alloy	31.50-32.00
195 alloy	32.50-33.00
13 alloy	34.50-36.00
ASX-679	31.50-33.25

Steel deoxidizing aluminum, notch-bar granulated or shot

Grade 1—95.97½%	32.50-33.50
Grade 2—92-95%	31.50-32.50
Grade 3—90-92%	30.50-31.50
Grade 4—85-90%	29.50-30.50

ELECTROPLATING SUPPLIES

Anodes

(Cents per lb, freight allowed, 500 lb lots)

Copper	
Cast, oval, 15 in. or longer	39½
Electrodeposited	33⅜
Rolled, oval, straight, delivered	38⅞
Forged ball anodes	43
Brass, 80-20	
Cast, oval, 15 in. or longer	34¾
Zinc, oval	26½
Ball anodes	25½
Nickel 99 pct plus	
Cast	70.50
Rolled, depolarized	71.50
Cadmium	$2.80
Silver 999 fine, rolled, 100 oz lots, per troy oz, f.o.b. Bridgeport, Conn.	79½

Chemicals

(Cents per lb, f.o.b. shipping points)

Copper cyanide, 100 lb drum	52.15
Copper sulfate, 99.5 crystals, bbl.	12.85
Nickel salts, single or double, 4-100 lb bags, frt. allowed	20½
Nickel chloride, 375 lb drum	27½
Silver cyanide, 100 oz lots, per oz.	67¼
Sodium cyanide, 96 pct domestic 200 lb drums	19.25
Zinc cyanide, 100 lb drums	45.85

SCRAP METALS

Brass Mill Scrap

(Cents per pound, add ⅛¢ per lb for shipments of 20,000 to 40,000 lb; add 1¢ for more than 40,000 lb)

	Heavy	Turnings
Copper	23	22¼
Yellow Brass	20½	18⅝
Red brass	21½	20⅝
Comm. bronze	21¾	21
Mang. bronze	19½	18⅜
Brass rod ends	19⅞	...

Custom Smelters' Scrap

(Cents per pound, carload lots, delivered to refinery)

No. 1 copper wire	21.50
No. 2 copper wire	20.00
Light copper	19.00
Refinery brass	19.50*
Radiators	15.00

*Dry copper content.

Ingot Makers' Scrap

(Cents per pound, carload lots, delivered to producer)

No. 1 copper wire	28.00-29.00
No. 2 copper wire	25.00-26.00
Light copper	23.50-24.50
No. 1 composition	25.00-25.50
No. 1 comp. turnings	24.50-25.00
Rolled brass	19.00
Brass pipe	20.50
Radiators	19.00-19.50
Heavy yellow brass	19.00-19.50
Aluminum	
Mixed old cast	21 —22
Mixed new clips	24 —25
Mixed turnings, dry	21 —21½
Pots and Pans	21 —22
Low copper	25

Dealers' Scrap

(Dealers' buying prices, f.o.b. New York in cents per pound)

Copper and Brass	
No. 1 heavy copper and wire	25½—26½
No. 2 heavy copper and wire	24 —25
Light copper	22 —22½
New type shell cuttings	22 —22½
Auto radiators (unsweated)	17½—18
No. 1 composition	22 —23
No. 1 composition turnings	21 —23
Clean red car boxes	19 —19½
Cocks and faucets	19 —19½
Mixed heavy yellow brass	16½—17
Old rolled brass	18½—19
Brass pipe	20 —20¼
New soft brass clippings	16 —21
Brass rod ends	19½
No. 1 brass rod turnings	19
Aluminum	
Alum. pistons and struts	14 —14½
Aluminum crankcases	17 —17½
2S aluminum clippings	21½—22
Old sheet and utensils	17 —17½
Borings and turnings	13 —14
Misc. cast aluminum	17 —17½
Dural clips (24S)	17 —17½
Zinc	
New Zinc clippings	17 —18
Old Zinc	12½—13
Zinc routings	8½— 9
Old die cast scrap	8 — 8½
Lead	
Soft scrap, lead	16½—16¾
Battery plates (dry)	9½—10
Miscellaneous	
Block tin	110 —120
No. 1 pewter	80 —85
No. 1 auto babbitt	75 —80
Mixed common babbitt	16 —17
Solder joints	23 —24
Siphon tops	75 —80
Small foundry type	18¾—19
Monotype	17½—18
Lino. and stereotype	17
Electrotype	15¾—16
Hand picked type shells	11½—11¾
Lino. and stereo. dross	9½—10
Electro. dross	7½— 8

Scrap Nickel & Monel Ceilings

(F.o.b. shipping pt., cents per lb)*

Pure nickel	40½
New Monel clips, rods	33
Old & soldered Monel sheet	28
No. 1 Monel castings, turnings	26
K & S Monel clips, rods	31
K & S Monel turnings	24

*Add ½¢ per lb for nickel shipments over 2000 lb, for Monel shipments over 20,000 lb. Converter's premium of 4¢ per lb is allowed for these grades.

SCRAP *iron and steel*

markets prices trends

Scrap trade's hard work meets the test so far . . . Melt schedules stay at peak . . . Scrap salvage drives important.

The energetic response of the scrap trade to the vital need for scrap metal to feed furnaces turning out steel for defense and the civilian economy has staved off a drop in the melt schedule. Steelmaking has been continuing at a record rate. It has demanded that scrap men get out all the scrap available. They have done so. The steel industry and the nation owe them a debt of gratitude.

They have put on the pressure, worked harder, and it has borne results. Now that steelmaking faces a pinch in getting enough scrap for fall and winter operations, the plants which use steel products should pitch in and help scrap salvage drives. NPA's goal is 3 million extra tons of industrial scrap. Plant owners should search their plants conscientiously and start useless equipment circulating through scrap channels.

Scrap men are worrying about adequate supplies for winter operations. Some think cutbacks in steelmaking are certain. Others are keeping their fingers crossed and preparing for a new and greater test of the trade's ingenuity.

Pittsburgh mills are measuring supply variations by fractions of a day. Chicago mills are beginning to enter into the allocation picture. Cast movement in Chicago is quickening.

PITTSBURGH—Scrap consumers are measuring inventory fluctuations with a micrometer, relatively speaking. A very large mill reported inventory had improved by three-tenths of a day's supply and is hovering around 2 days. Nevertheless there is a feeling here that mills, with the help of allocations, will be able to squeeze through the summer. Winter weather will mean cutbacks for sure. An almost imperceptible improvement in scrap movement was noted.

CHICAGO—As yet no local mill has shown any ill effects production-wise because of the scrap shortage. Scrap for immediate production is not the problem but rather the building up of an inventory for the fall and winter months. Another fairly large mill is expected to receive allocations in the near future. So far there have been allocations to one major consumer and another medium sized mill. Dealers in the area are reported to have received allocations of foundry scrap to Wisconsin, presumably in the Milwaukee area. Some sources report movement of cast into the area is picking up with one fair sized foundry out of the market for cast.

PHILADELPHIA—Despite reports from other districts, the trade maintains that no local mills are accepting upgraded material. Generally, the flow of scrap is disappointing and pessimism reigns. This is the season's peak and everyone wonders what will happen to mill schedules when the season ends. A few days of bad weather cut down yard intake and auto wreckers are practically the only source of supply. Industrial suppliers are conserving as much material as they can and what little does get out as scrap is allocated back to the steel supplier directly.

NEW YORK—Movement of industrial and shipbuilding scrap continues slow. The overall situation is not too encouraging. Stockpiles of mills are not gaining any—as they should for fall and winter operations. The scrap trade's pressure to fill demand is terrific. Everything available is being ferreted out. Upgrading in this area has been held down to a minimum in view of the many obstacles nowadays. Yesteryear's easy supply of good scrap is gone.

DETROIT—Attempts to look ahead in Detroit's scrap situation are not too encouraging. Most local mills are losing inventory. Some auto plants have reported substantial cuts in scrap generation during May. Even larger reductions in the amount of fast-circulating scrap are expected during June and the third quarter. Based on the situation that is new developing, an acute scrap shortage here as early as July is possible, according to informed trade sources. Government inspectors have been here this week but no spectacular developments are reported. The government policy thus far seems to be to do nothing that will interfere with the movement of scrap.

CLEVELAND—A rising tide of pessimism on the part of brokers and buyers is the most outstanding aspect of the market here and in the Valley this week. Otherwise, there is nothing unusual, upgraded tonnage is being down-graded and the spread of all available tonnage is very thin. Brokers have been buying a lot of remote material for the foundries, at freights of from $12 to $25 a ton. Foundries that can use items 20 and 21 are having a picnic, relatively speaking.

ST. LOUIS—The flow of scrap iron to steel mills in the St. Louis industrial district has been shifted to other areas by allocations causing consumers here to apply for allocations themselves. It is said that their inventories are now down to about 3 weeks' supply. Railroads lists continue light, as lines continue to husband their equipment. The movement by truck to local yards has improved but the material mostly is of the lighter variety.

BIRMINGHAM—Some industrial plants in this area are beginning to take stock of obsolete machinery and worn-out equipment to see what they can dispose of to ease the scrap situation. In the meantime the shortage continues and everything coming into the district is grabbed quickly. Some foundries are down to one-week supply.

CINCINNATI—Scrap is moving but not in the tonnages desired. Consumers, particularly the mills, are putting on plenty of pressure and brokers are scrambling for every car. No consumers, however, including foundries, have any melting capacity shut down for lack of scrap. There has been very little upgrading here and few allocations, if any, have been made from the Cincinnati district. One local consumer was allocated tonnage from another district, but on the whole this area has held its own.

BOSTON—Activity in the Boston scrap iron and steel market continued normal this week. More attention is expected to be centered on in-plant scrap drives to pry loose scrap for consumers.

BUFFALO—With mills here unable to replenish reserve stocks of scrap, despite increased receipts by water, interest centered this week on formation of the Buffalo Industrial Scrap Mobilization Committee. Added to the recent influx of scrap by water were three barge fleets from the eastern seaboard, via canal, with 9000 tons aboard. Meanwhile, mill reserve stocks were only a shade above 2 weeks' supply.